The Effect of Film Score on Emotion and Self-Talk

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THE EFFECT OF FILM SCORE ON EMOTION AND SELF-TALK

By

Angela Nanette Davis

A THESIS

Submitted to the Faculty
of the University of Miami
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the requirements for the degree of
Master of Music

THE EFFECT OF FILM SCORE ON EMOTION AND SELF-TALK

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The purpose of this study was to first assess the effect of film score on affect in healthy young adults. Second, the study examined the subsequent effect of mood change on self-talk in relation to a stressor. Participants were 131 University of Miami undergraduate students between the ages of 18 and 24 who were not musicians, recruited from all departments of study, excluding the Frost School of Music. Each participant completed a mood assessment, resulting in both a PASS (positive) and Dysphoria (negative) score, prior to one of three mood induction conditions: negative film score, positive film score, and control.

Participants in the negative film score group listened to film score excerpts that portrayed feelings of sadness, loss and/or disappointment for 15 minutes. In the positive film score group, participants listened to film score excerpts that depicted feelings of happiness and/or encouragement for 15 minutes. Those participants who were assigned to the control group listened to a 15-minute recording of naturally-occurring sounds from a classroom. Following mood induction, participants completed the mood assessment a second time. Next, participants watched a stressor video, then completed the self-talk questionnaire and lecture assessment. To investigate two research questions, the researcher observed the effect of the auditory stimulus on positive and negative mood with a one-way
analysis of variance (ANOVA), then assessed any correlations between change in mood and self-talk (i.e., informational and controlling).

In regard to the first research question, the analysis showed a significant difference in dysphoria change scores between the control condition and positive mood induction condition ($MD=3.1, SE=.91, p=.002$). The analysis also revealed a significant difference in dysphoria change scores between negative and positive mood induction conditions ($MD=2.59, SE=.87, p=.01$). In regards to PASS change scores, tests revealed a significant difference ($MD=8.32, SE=1.13, p<.001$) between positive mood induction and the control condition. A significant difference also emerged between the positive and negative mood induction conditions for PASS change scores ($MD=6.61, SE=1.08, p<.001$).

In regard to the second research question, PASS change scores and controlling self-talk scores had a significantly negative correlation ($r = -.35, p < .05$) during the negative film score condition. For positive film score, PASS change scores and informational self-talk scores also had a significantly negative correlation ($r = -.31, p < .05$). For the control group, dysphoria change scores and informational self-talk scores had a significantly positive correlation ($r = .31, p < .05$). Last, PASS change scores and controlling self-talk scores had a significantly negative correlation ($r = -.27, p < .01$).

Film score was effective at shifting mood in the intended direction for most participants. Subsequently, participants appeared to use self-talk as a tool for self-regulation, as participants with a higher negative mood score tended to use more self-talk than those with lower negative mood scores.
DEDICATION

I would like to dedicate this thesis to my family. My grandparents, parents, siblings and godparents have tremendously supported and encouraged me emotionally, spiritually, mentally and physically throughout this venture. This project comes from the core of who I am and how I was raised, but it has taken everything in me to successfully complete. My family has given me the support I needed for that completion, and I thank God for them. A special dedication goes to my aunt O’Dean Johnson and godsister Venisha L. Combs, my two new guardian angels who continued to encourage me during their transitions, sacrificing our last moments together for my successful completion of this endeavor. Any tenacity that I have shown is because of these people, and so I dedicate this project to them, in memory and in love.
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Chapter 1

Introduction

Statement of the Problem

Mood is vital to numerous cognitive functions and, as such, becomes central to how people connect to the world (Burke, 2014a). Daily events from an individual’s environment -- like being stuck in traffic or receiving bad news -- can be disturbing and cause changes in mood, interfering with the ability to function (Burke, 2014b). Stressors from the environment can trigger negative mood, or affect; however, some people are simply more inclined toward negative affect than others (Whittle, Allen, Lubman, & Yücel, 2006). Persistent and powerful negative affect can lead to mental health and behavioral problems; such as depression, hostility, and aggression (Evans & Lepore, 2008; Geschwind, van Os, Peeters & Wichers, 2009). In contrast, positive affect builds resistance against the consequences of negative affect. For these reasons, researchers should explore ways to help people maintain or access positive affect in order to avoid potential negative outcomes.

Numerous studies demonstrate a high incidence of negative affect in young adults of college age. Many demanding transitions from adolescence to adulthood occur during typical college years, including living alone or with a stranger, defining emotional values or boundaries, and organizing finances for the first time, all while learning new concepts for a future career (Aselton, 2012; Seligman & Wuyek, 2007). Furthermore, stressors among college students in the United States commonly lead to high sleep deprivation and burnout, as well as lower levels of empathy (Rosen, Gimotty, Shea & Bellini, 2006). Ineffective handling of these transitional challenges can lead to persistent negative affect
and clinical mood disorders, such as depression and anxiety. Consequently, negative affect is commonly experienced in United States college students who may demonstrate a 31% prevalence in depression at levels that increase greatly and rapidly during the academic year (O’Hara, Armeli, Boynton & Tennen, 2014; Rosen et al., 2006).

Eventually, depression and anxiety heighten self-criticism in college students, which can lead to difficulty in relationships, issues with substance abuse, problems with academic success, and suicidal ideation (Allen & Holder, 2014; Burke, 2014c; Kelly, Zuroff & Shapira, 2009; Lester, 2014; Vitasari, Wahab, Othman & Awang, 2010). In addition, depression and/or anxiety may lead to rumination and worry, both involving negative, moderately uncontrollable, repetitive thoughts and images (Calmes & Roberts, 2007). These issues can reinforce the initial risk factors, thus intensifying a depressive mood and elongating a depressive episode, creating a cyclical pattern. Throughout this cycle of emotional stressors, an individual’s ability to cope in a healthy manner is critical.

One way to develop the ability to cope is to adopt a mechanism or a method of understanding. To that end, Olff, Langeland and Gersons (2005) offer the stress-coping model in which an individual experiencing a stressful event will have an emotional response to that event, then use a defense or coping mechanism to obtain a mental or physical outcome (Olff, 2011). This coping mechanism can be negatively or positively valenced and has a reciprocal relationship with mood state. Self-talk, a particular coping mechanism, is a form of intrapersonal communication that one can use as a cognitive coping strategy for motivation and emotion regulation (Oliver, Markland, & Hardy, 2010; Tenenbaum, Edmonds & Eccles, 2008).
Self-talk can be used to effectively master cognitive and motor tasks, as well as maintain stability in social and emotional situations (Burton, Gillham, & Glenn, 2013; Hatzigeorgiadis et al., 2009; Kelly, Zuroff, & Shapira, 2009; Kendall & Treadwell, 2007; Wang, Brennan, & Holte, 2006). Controlling self-talk sometimes consists of controlling statements that can pressure the individual into a path of task completion that may not be the most effective, creating mental and emotional stress (Oliver et al., 2010). In contrast, informational self-talk allows the individual to explore options of success for the most efficient choice to task completion.

Controlling self-talk could be a deprecating statement such as, “I know it’s my first yoga class but I’m so uncoordinated and inflexible, I don’t look like the instructor at all.” In contrast, informational self-talk might sound more like “I have the general form of this posture; it’s only my first class, my flexibility will come with practice.” The persistently negative statements of controlling self-talk can eventually lead to poor decision-making and an unconstructive bias in critical thinking or problem solving abilities. Informational self-talk, however, contradicts incessantly negative affect and self-talk by identifying alternatives to an individual’s typical thought process.

The cyclical nature of negative affect and controlling self-talk in healthy adults can lead to or worsen various mental and emotional issues, including anxiety and depression, maladaptive views of self-efficacy, and lack of self-confidence (Burton, Gillham, & Glenn, 2013; Hatzigeorgiadis, Zourbanos, Mpoumpaki, & Theodorakis, 2009; Kelly, Zuroff, & Shapira, 2009; Kendall & Treadwell, 2007; Wang, Brennan, & Holte, 2006). When affect is negative, self-talk tends to be controlling; in return, controlling self-talk reinforces and intensifies negative affect (Oliver et al., 2010;
Tenenbaum et al., 2008). Similarly, positive affect tends to produce informational self-talk, which can further improve mood. Modifying affect can potentially change the content of self-talk, thus improving various cognitive outcomes, such as critical thinking and decision-making. One way to modify affect is through music listening, which can influence emotional processing and is commonly used to alter mood (North, Hargreaves & Hargreaves, 2004).

Neuroimaging research reveals several parallels between the neural structures used for emotional processing and those activated during music listening, building a foundation for music’s effects on emotion (Bear, Connors, & Paradiso, 2007; Blood & Zatorre, 2001; Blood, Zatorre, Bermudez, & Evans, 1999; Brown, Martinez, & Parsons, 2004; Dolan, 2002; Gazzaniga, Ivry, & Mangun, 2009; Menon & Levitin, 2005; Papez, 1937; Whittle et al., 2006). To explain further, the research literature supports the idea that music-induced mood change can influence cognitive functions, such as memory and executive function (de l’Etoile, 2002; Gardiner, 2008; Lesiuk, 2000; 2010).

Furthermore, film score, a genre of music written with emotional intent, can shift mood, communicate emotion, and clarify depicted emotion in order to shape an audience’s interpretation of a film’s narrative (Cohen, 2010; 2013; Davis, 2010; Green, 2010; Hickman, 2006; Kalinak, 2010; Larsen, 2007). The term “film score” is reserved for original music written specifically for a film, differing from previously-written music adopted for the film. Film score, as opposed to film music, tends to be instrumental in nature while film music can include songs with lyrics. Emotional responses to film score can influence subsequent cognitive performance; therefore, as film score impacts the listener’s mood, it may shape the cognitive coping mechanism known as self-talk.
Need for the Study

This study will offer both theoretical and clinical relevance. Theoretically, if the results are reflective of the literature, this study will further support a connection between music, affect, and cognition. More specifically, the results could establish a link between film score, mood, and a cognitive function, such as self-talk. Understanding the influential relationship between music, affectivity, and cognition will be most valuable in practical applications.

In regard to clinical application, researchers and clinicians will gain knowledge of an aesthetic stimulus that can be used to modify affect and cognitive appraisal of affective experiences. In a music therapy session, the clinician might use film score to induce a particular mood, then focus on reshaping cognitive functions such as an individual’s interpretation of an event. As a tool in mood induction, film score may be used to treat mood disruptions and unhealthy thought processing associated with anxiety, depression, and bipolar disorder. Emotional responses to film score may influence an individual’s appraisal pattern and perception of daily events, which could enhance overall affect.

Purpose Statement

The purpose of this study is to first assess the effect of film score on affect in healthy young adults. Second, the study will examine the subsequent effect of mood change on self-talk in relation to a stressor.
Chapter 2

Review of Related Literature

Brain Areas in Emotional Processing

Experiencing emotion is the result of a complex set of interactions between subjective and objective factors that are mediated by neural and hormonal systems (Dolan, 2002; Whittle et al., 2006). The subjective factors involve the affective experience and the behavior that it leads to, whereas the objective factors include the cognitive processes, and the widespread physiological responses to arousing conditions (Dolan, 2002; Sloboda & Juslin, 2001; Whittle et al., 2006). As the principal currency in human relationships, emotion is a motivational force in a majority of human decisions and interactions (Dolan, 2002). To understand the relationship between emotion, cognition, and behavior, a deeper comprehension of the respective brain processes is necessary.

Emotional processing of a stimulus results from activation of specific neural circuitry. The Papez circuit, a time-honored model for understanding emotional processing, involves both primitive and more sophisticated areas of the brain (Bear, Connors, & Paradiso, 2007; Gazzaniga, Ivry, & Mangun, 2009; Ghinassi, 2010; Papez, 1937). The circuit is activated when sensory stimuli activate the thalamus and proceeds into two pathways simultaneously: pathway A that bypasses the neocortex, and pathway B that activates the neocortex. This second pathway allows for finer analysis of incoming sensory information.

Pathway A projects the sensory information from the thalamus directly to the hypothalamus for emotional expression, circumventing the neocortex (Dalgleish, 2004;
Gazzaniga et al., 2009; Papez, 1937). The hypothalamus serves to mediate the functions of the central nervous system and autonomic nervous system for an initial physiological response (Bear et al., 2007). If the stimulus was the sound of a gunshot, the response elicited might be heart palpitations and irregular breathing. On the other hand, if the stimulus was the sound of soft rain hitting a rooftop, the initial response might be the relaxation of tensed muscles and regulated breathing.

The hypothalamus then activates the anterior thalamus, which Papez suggest is connected with the frontal and parahippocampal cortex (Dalgleish, 2004; Gazzaniga et al., 2009; Papez, 1937). The anterior thalamic nuclei regulate autonomic and emotional responses, and contribute to learning and memory through hippocampal connections (LeDoux, 1996; Papez, 1937; Phillips, Drevets, Rauch & Lane, 2003; Xiao & Barbas, 2002). The activation then travels from the anterior thalamus to the cingulate cortex, which Papez identifies as being responsible for emotional experience, or the affective response to the stimulus. In terms of the sound of a gunshot, the person might experience fear or panic, while hearing soft rain falling on a rooftop might produce an experience of serenity, or a relaxing calmness.

Following the emotional experience, the cingulate cortex activates the hippocampus for evaluation of the stimulus through emotional memories (Bear et al., 2007; Dalgleish, 2004; Gazzaniga et al., 2009; Papez, 1937). Emotional memories of previous experiences with a stimulus can either intensify the current response, or change the valence of the response. This activation then travels from the hippocampus back to the hypothalamus, with the added evaluation from emotional memories, for the final emotional expression.
Occurring simultaneously in Pathway B, the sensory information from a stimulus activates the thalamus, which transmits signals to the appropriate sensory cortex for further processing (Bear et al., 2007; Dalgleish, 2004; Gazzaniga et al., 2009; Ghinassi, 2010; Papez, 1937). For instance, the auditory information received from hearing a gunshot in a pleasant neighborhood would be further analyzed in the auditory cortex, which might lead to the conclusion that the sound was a firecracker instead of a gunshot. By contrast, the auditory cortex would process the sound of falling rain, as well as softer, sporadic rumbles of thunder, leading to the confirmation of a developing thunderstorm.

The sensory cortex, or the neocortex, sends signals deeper into the brain to the cingulate cortex (Bear et al., 2007; Dalgleish, 2004; Gazzaniga et al., 2009; Ghinassi, 2010; Papez, 1937). The neocortex surrounds the cingulate cortex and provides it with what Papez calls emotional consciousness or emotional coloring, which further shapes the emotional experience. At this point, the pathway continues in the same way as Pathway A to the cingulate cortex, which produces the affective response, then on to the hippocampus and finally the hypothalamus, which triggers the final emotional expression. The affective response in Pathway B is influenced by sensory input from the sensory cortex instead of being driven by the preliminary physiological response from the hypothalamus in Pathway A.

The significance of Papez circuit lies in the connection it establishes between brain structures, emotional experience, and emotional expression (Dalgleish, 2004; Gazzaniga et al., 2009; Papez, 1937; Parmeggiani, Azzaroni & Lenzi, 1971). In Papez circuit, both primitive and advanced brain areas are used in the experience and expression of emotion. The interaction between the cingulate cortex and hypothalamus demonstrates
how feedback from high-level structures shape the reaction of the hypothalamus, thereby enabling humans to express emotion in a more cognizant manner (Dalgleish, 2004; Gazzaniga et al., 2009; Papez, 1937). This connection, evident in both pathways, enables thorough evaluation of stimuli for a well-informed emotional response.

While Papez circuit is still recognized by many researchers today, newer research no longer accepts one neural circuit for all emotion (Gazzaniga et al., 2009). More recent studies focus on identifying the different neural systems underlying specific emotional tasks and situations (Bear et al., 2007; Gazzaniga et al., 2009). For example, the medial prefrontal cortex is responsible for general emotional processing. After activation of this cortical structure, other specific regions are associated with certain basic emotions (Phan, Wager, Taylor & Liberzon, 2002).

Sloboda and Juslin (2001) conducted an extensive review of literature in order to better understand and define basic emotions. Basic emotions are immediate responses to everyday events related to various goals (Gigerenzer & Goldstein, 1996). For example, the basic emotion fear is an immediate response to something that threatens one's goal of self-preservation (Oatley, 1992; Plutchik, 1994; Sloboda & Juslin, 2001). The basic emotion sadness is in response to deficiency or absolute failure of a goal. The five commonly-accepted basic emotions include happiness, sadness, anger, fear and disgust. The wider array of experienced emotions are considered secondary or complex emotions which stem from basic emotions. They are a blend of two or more basic emotions, or a basic emotion and a cognitive reaction.

While certain brain imaging studies provide conflicting information, some studies have shown that four of the five basic emotions are associated with specific brain areas.
The amygdala has long been associated with negative emotion, specifically fear (Phan et al., 2002). While sadness, anger, and aggression are also negative emotions that show activation in the amygdala, sadness is more significantly associated with the subcallosal cingulate cortex (Gazzaniga et al., 2009; Phan et al., 2002). The regulation of anger and aggression, however, are specifically associated with the hypothalamus (Ghinassi, 2010). Significant activation occurs in the basal ganglia for both disgust and happiness (Phan et al., 2002). The nucleus accumbens is also associated with positive affectivity, mainly happiness and reward-related behaviors (Whittle et al., 2006). Lastly, the orbitofrontal cortex is mainly responsible for emotion regulation, specifically the inhibition and constraint of emotional behaviors, whether positive or negative in valence.

In summary, emotional processing in Papez circuit involves activation of the thalamus, hypothalamus, anterior thalamus, sensory cortex, cingulate cortex, parahippocampal area, and hippocampus. In addition, more recent studies have identified activation of the medial prefrontal cortex, subcallosal cingulate, basal ganglia orbitofrontal cortex, amygdala, nucleus accumbens, and insula during processing of basic emotions.

**Brain Areas Activated during Music Listening**

Various brain regions that have a role in emotional processing are also activated during pleasant or unpleasant music listening. These structures are located in limbic and paralimbic regions with supporting structures located in other cortical and subcortical regions. The following brain imaging studies look at areas of brain activation during music listening over the past two decades, and will be presented chronologically.
In an early study, Blood, Zatorre, Bermudez and Evans (1999) found five brain areas that were activated during either pleasant or unpleasant music listening. Activation in the parahippocampal gyrus and precuneus regions increased in relation to increased dissonance, or unpleasant music. In regard to increased consonance, or pleasant music, the subcallosal cingulate and frontal polar cortex were activated. Activity in the orbitofrontal cortex corresponded with increasing consonance in music, feelings of pleasantness, and emotional responses of positive valence.

After listening to self-selected classical music that was purposely chosen to induce frequent chills and intense, pleasant emotional responses, Blood and Zatorre (2001) found that several brain areas were activated. The authors define an intensely pleasurable response to music as one that involves psychophysiological activity connected to an emotional response, including a change in heart rate, respiratory rate, skin temperature and electrical activity in both skin and muscles.

In addition to the orbitofrontal cortex, activation of the insula was also correlated with intensely pleasurable responses to music (Blood & Zatorre, 2001). Other structures activated included the nucleus accumbens, midbrain, thalamus, anterior cingulate, cerebellum, and supplementary motor area. The anterior cingulate cortex is associated with arousal and attention during music listening, as well as emotion regulation (Brown, Martinez, & Parsons, 2004; Menon & Levitin, 2005; Whittle et al., 2006). While the nucleus accumbens is generally involved in positive affective processing, the anterior cingulate is involved in both negative and positive affective processing. The authors explain that no movement occurred during this study, indicating that the structures usually associated with motor processing such as the cerebellum and supplementary
motor area, are also involved in the emotional processing of music (Blood & Zatorre, 2001).

The authors further discovered that during intensely pleasurable responses to music, deactivation occurred in the hippocampus, amygdala, and ventromedial prefrontal cortex (Blood & Zatorre, 2001). The hippocampus and the amygdala are limbic system structures involved in the perception and processing of a variety of emotions, namely fear and anxiety (Whittle et al., 2006). The precuneus and cuneus regions also showed deactivation during intensely pleasurable responses to music. Another study published three years later focused on brain areas activated in response to unfamiliar music.

When participants listened to unfamiliar Greek folk music, primary activation occurred in temporal structures, including the primary auditory cortex, auditory association cortex, superior temporal sulcus, temporal pole, middle temporal gyrus and the insula (Brown et al., 2004). These structures are associated with the perceptual and cognitive aspects of music listening, especially when listening to unfamiliar music. The limbic and paralimbic areas activated include the subcallosal cingulate, anterior cingulate, retrosplenial cortex and hippocampus. The subcallosal cingulate and anterior cingulate are known to activate for affective tasks, including music listening.

The nucleus accumbens and the anterior and posterior regions of the cerebellum were also activated during unfamiliar music listening (Brown et al., 2004). The posterior cerebellum is associated with music processing, while the anterior cerebellum is linked to affective processing. While orbitofrontal cortex activation was not documented, the authors acknowledge and support previous findings on this brain region. They identify the orbitofrontal cortex as responsible for emotional processing of music, as it receives
projections from the temporal pole. The majority of the activated structures were located in the left temporal cortical, limbic and paralimbic regions, showing correlation between left hemispheric activation and positive affective responses. In a study published a year later, activity in the brain’s reward system was examined in response to music listening.

The mesolimbic dopaminergic reward system was also active during passive music listening (Menon & Levitin, 2005). This system, commonly known as the brain’s pleasure center, responds to pleasing stimuli as well as unpleasant stimuli as a tool of reinforcement (Cloutier, Heatherton, Whalen & Kelley, 2008; Georgia Health Sciences University, 2011; Knutson, Adams, Fong & Hommer, 2001; National Institute on Drug Abuse, 2010; Murray, 2007). The cerebral cortex activates the amygdala, orbitofrontal cortex, ventral tegmental area (VTA), nucleus accumbens and other structures in Brodmann’s area to mediate dopamine-release, inducing pleasurable effects to regulate behavior. The pleasurable effects produced from the release of dopamine increase the probability of repeating a particular behavior.

The VTA and the nucleus accumbens are two key structures in the reward system (Menon & Levitin, 2005). When the VTA released dopamine in response to music listening in this study, this process influenced activation in the superior temporal gyrus and anterior insula. In response to dopamine release, significant interaction occurred between the nucleus accumbens and the following brain areas during passive music listening: hypothalamus, orbitofrontal cortex, inferior frontal cortex, anterior thalamus, cerebellar vermis, and brainstem. The unique feature of this study is the identification of hypothalamic activation in response to music listening. The hypothalamus mediates autonomic responses to music, such as heart and respiratory rate. The hypothalamus,
however, was not an area of interest in similar previous studies and its activation was therefore not reported. A study done three years later seeks to identify the amygdala; a specific structure involving emotion and music processing.

Koelsch, Fritz and Schlaug (2008) explored amygdala activation in response to expected versus unexpected music listening. Participants rated pleasantness in music stimuli with an aurally-expected ending and music stimuli with an unexpected, or harmonically irregular, ending. The unexpected ending was rated unpleasant, while the expected ending was rated pleasant. The authors predicted a correlational relationship between amygdala activation and the pleasantness of a stimulus which is supported by the notion that people tend to be more pleased when situations in everyday life go as expected. During music listening, the authors observed greater amygdala activity when participants perceived unpleasantness in chord progressions when compared to pleasant chord progressions. These results show that cognitive and emotional processing of irregularities in music syntax activate the amygdala. In a more recent study, researchers further explored the brain’s reward system in relation to music listening.

Research on pleasurable music listening and the reward system has identified specific functions in ventral and dorsal striatum activation (Salimpoor, Benovoy, Larcher, Dagher & Zatorre, 2011). The ventral striatum includes the nucleus accumbens and olfactory tubercle, while the dorsal striatum consists of the caudate nucleus and putamen. Participants selected a chill-inducing instrumental piece of music from classical, jazz, folk, electronica, rock, punk, techno and tango genres. A chill is a sudden passing sensation of excitement, specifically in response to music. Chills were used as a pleasure
index to objectively identify the specific time of maximal pleasure (i.e., reward) during music listening. Participants listened to their chosen music during neuroimaging.

Reward-related anticipation involved the participants’ knowledge of an upcoming chill in response to a particular musical passage. Results revealed that the anticipation of a reward correlated with increased dopaminergic activity in the caudate nucleus. Experiencing the reward itself, the experience of chills, showed significantly positive correlations with activation of the nucleus accumbens during subject-selected instrumental music listening.

In conclusion, the brain structures activated during music listening are located in the limbic area, the paralimbic area, as well as various cortical and subcortical regions. Structures in the limbic and paralimbic regions include the hippocampus, thalamus, amygdala, hypothalamus, parahippocampal area, anterior cingulate cortex, and the mesolimbic reward system.

Moreover, bilateral cortical structures activated during music listening are located in the temporal lobe include the primary and secondary auditory cortices, superior temporal sulcus, temporal pole, and middle temporal gyrus. Cortical structures located in the frontal and parietal lobes include the frontal polar cortex, inferior frontal cortex, orbitofrontal cortex, subcallosal cingulate cortex, supplementary motor area, precuneus, and insula. Hindbrain cortical structures include the cerebellum and brain stem. Subcortical structures include the dorsal and ventral striatum where the nucleus accumbens is located, and the VTA located in the midbrain. These brain areas are all involved in emotional experiences during music listening.
Neural Overlap of Music and Emotion

Evidence from research shows a clear overlap between brain structures activated during the processing of emotional experiences and areas activated during music listening. Brain areas activated in both music listening and in Papez circuit of emotional processing include the thalamus, sensory and associative cortices, hypothalamus, anterior cingulate cortex and hippocampus. Additionally, brain areas activated during music listening and the processing of basic emotions include the orbitofrontal cortex, parahippocampal area, subcallosal cingulate cortex, amygdala and insula. Listening to music elicits an emotional response as shown by common brain area activations. This overlap provides a proposed scientific mechanism to explain how music listening affects emotion. See Table 1 for all brain areas involved in both music listening and emotional processing.
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Note.  
<sup>a</sup> Brain areas involved in the original emotional processing circuit proposed by Papez  
<sup>b</sup> Brain areas discovered more recently in addition to Papez emotional processing circuit
Film Score and Emotion

Film score is a genre of music used in movies to impact the emotions of the listener and evoke an intended response. As mentioned in Chapter 1, the term “film score” is reserved for original music written specifically for a film, differing from previously-written music adopted for the film. For the purposes of this research, film score will be the instrumental music written specifically for use in film (Cohen, 2010; 2013; Green, 2010).

Film score is widely known as an art form that adds aesthetic value to film (Cohen, 2010; Davis, 2010; Green, 2010; Hickman, 2006; Kalinak, 2010), but this is only one of many emotional functions of film score. The plot of a film, or how the story unfolds, is called the narrative (Larsen, 2007). Film score actively shapes the mood and emotions portrayed in the narrative as well as the emotional response of the viewer. This emotional shaping of the narrative is accomplished by further communicating the meaning and significance of the story, especially in ambiguous situations.

Different viewers can interpret a narrative, sometimes called the working narrative, in several ways. The degree of ambiguity in a particular narrative scene is directly related to the number of available interpretations of the narrative. Film score serves as an indicator of how that narrative should be understood or experienced (Cohen, 2010; Green, 2010; Hickman, 2006; Kalinak, 2010; Larsen, 2007). For example, a visual of a woman running from a man through a house is given at the beginning of a particular scene. If scary-sounding music were added, one would prepare for a potentially disturbing story. However, if the added music were a romantic ballad, one would
understand the scene as a playful tryst and may further engage in the couple’s love story. In this manner, film score directly impacts the interpretation and perception of film.

Film score composers use specific methods to direct the emotions, interpretation and perception of a narrative, including congruence. Congruence focuses on matching the structures of the music with the given visual information (Cohen, 2010; 2013). As an example of this technique, a flute and violin play brief, high pitches as a dainty character tiptoes through an environment. In contrast, a heavier or villainous character would be portrayed with lower pitched sounds of longer duration. Sometimes called “Mickey Mousing” (Cohen, 2013, p. 176), this technique is best demonstrated in cartoons and can be used alone or in conjunction with association.

The technique of association involves the application of musical qualities that quickly connect with certain meanings and emotions, as understood within a given culture (Cohen, 2010; 2013; Hickman, 2006; Kalinak, 2010; Larsen, 2007). Minor tonalities usually indicate sadness, while major tonalities indicate happiness or joy. These types of musical consistencies are used to indicate what is occurring within a character or to clarify an ambiguous event in the narrative. These associations are also used to evoke emotion in the audience. Of further importance to the concept of association is the leitmotif.

The leitmotif, or repeated melodic theme, is the most commonly-used of all musical elements in film scoring (Cohen, 2010; 2013; Green, 2010; Hickman, 2006; Kalinak, 2010; Larsen, 2007). This theme becomes linked with a character, place, situation or an emotion within the narrative as it is repeated at certain times. Through the
technique of association, the leitmotif becomes a tool of identification that is easily recognized within the narrative.

One of the most recognizable leitmotifs in film is the ascending half-step of the main theme from Steven Spielberg’s horror film *Jaws* (Brown & Spielberg, 1975) (Hickman, 2006). The theme returns throughout the narrative when a dangerous shark is within human proximity. This repetition of the leitmotif links with the dangerous situation caused by the presence of the shark. Any changes to the leitmotif’s melody mark a development in the characters or situations in the narrative, especially changes in the emotional tone of the narrative (Cohen, 2010; 2013; Green, 2010; Kalinak, 2010; Larsen, 2007). The leitmotif is used in conjunction with the techniques of congruence and association to shape a person’s interpretation and perception of a working narrative, further explained by the Congruence Associationist Model (Cohen 2010; 2013).

Cohen (2010; 2013) developed the Congruence Associationist Model-Working Narrative (CAM-WN) as a framework that explains how film score works with sensory information to impact a viewer’s interpretation of the working narrative (Boltz, 2004). The model explains that interpretations of the narrative begin when the film activates five channels of visual and auditory sensory input; including text, speech, scenes, music, and sound effects. The viewer then codes these stimuli into structures and meanings. Social norms, story grammar, and inclinations from the viewer’s long-term memory further shape expectations about the narrative.

When watching a film, the viewer is continuously trying to create a match between sensory input from the film and expectations from long-term memory (Cohen 2010; 2013). When a match is made, the viewer creates a clear interpretation of the
narrative. In contrast, when a match is not made, tension and discomfort build in the viewer. Film scorers often use this technique as a way to build anxiety in a viewer when watching a horror film or thriller. For example, if the shark’s theme is heard in the movie *Jaws*, the viewer expects to see the shark. However, if the shark is not visible in the scene, tension is building in the viewer in anticipation of the appearance of the shark and the associated consequences.

**Effects of Film Score on Emotion, Interpretation, and Perception**

Researchers have explored the relationship between the perception of film score and interpretations of the films, specifically regarding emotion. Ballerjahn and Güldenring (1994) conducted a study to investigate how film score influences the interpretation and perception of a film. This founding study has generated decades of interest in the intentions and effects of film score on emotion. The authors theorized that film scoring changes the interpretation of content, as well as possible continuations of the story, mood, and genre of the film.

In this study, five different film scores were set to a short film, creating five versions of the same film. The film score versions included two crimes, a thriller, melodrama, and an indefinite version that was scored in a pop style. Healthy adults watched one assigned version of the film and then answered questions pertaining to mood, perceived genre, plot, and continuations of the film. The perceptions and interpretations given in their answers were profoundly different between film score versions.

Differences in musical elements of each film score, regardless of genre, impacted the viewer’s perceptions of how the story would end. The two crime versions of the film
led viewers to different plot continuations. The first crime version (CV1) resolved with a major chord. The perceived story for CV1 resulted in more positive continuations in which the three characters in the film peaceably resolved a perceived conflict. The second crime version (CV2) led most viewers to a crime of passion, based on the musical tension throughout the score. This tension was characterized by arpeggiated and ascending dissonant chords played in a percussive manner on the piano.

The thriller version and both crime versions of the film were rated as “thrilling” and classified in the researcher’s general crime genre when viewers judged the mood of the film. Moreover, the melodramatic version was labeled “sad and sentimental,” and classified as a melodrama. Lastly, participants construed the indefinite version as a “problem film” that was lacking in any definitive declarations or resolutions of conflict. Viewers reported highly variable emotional responses to this version.

Ballerjahn and Güldenring (1994) conclude that film score influences the meaning of the picture which supports the theory that perception and interpretation of a film are contingent upon the accompanying score. Each composer’s film score changed the perceived story content, which was directly linked to unique musical elements in each piece. Additionally, the authors concluded that film score emotionally characterizes the story content of the film, which corresponds to the intention for which the film score was created. Subsequent research has focused specifically on the effect of film score on the emotional content of participant plot continuations.

Vitouch (2001) investigated the effect of musical context on plot continuations by selecting two instrumental pieces of music with contrasting emotional content to score the same film sequence. One piece consisted of an original scoring for the scene and the
other was Samuel Barber’s *Adagio for Strings*, op. 11, from 1936. The author described the original score as “ambivalent” with a positive mood. The Barber composition, in contrast, was summarized as a “melancholic” piece with a dominant negative mood. Young adults watched the minute-long opening sequence of Billy Wilder’s film drama *The Lost Weekend* (Brackett & Wilder, 1945) and were asked to use their imaginations to write a possible continuation to the story as well as explain the underlying reasons for their continuation. The researcher focused data analyses on the emotional content of the plot continuations.

The author further categorized the emotional content of the plot continuations into four classifications: emotionally ambivalent, indifferent, positive, or negative. Analyses of continuations showed few responses of emotional indifference for either score version. This result demonstrates the trend of both film scores in guiding participants toward profoundly emotional plot continuations. Specifically, the original scoring led to more positive and optimistic plot continuations, while Barber’s version led to predominantly negative plot continuations.

The researcher used content analysis to identify descriptive words that participants used to explain their individual interpretations of the music. Those who listened to the original scoring typically used words such as agreeable, positive, dramatic, and romantic, while those who listened to Barber’s arrangement consistently used words like melancholic, sad, gloomy, and tender. The majority of the participants also instinctively listed music as the central motivating factor behind their plot continuations in their explanations, along with camera angle, situational cues and clichés.

Vitouch (2001) determined that the interpretation of the emotional content of the
plot is based on the emotional content of the film score. The author concludes that different musical versions of the same film sequence can lead to different plot continuations, mostly in the category of emotional content. While Vitouch’s work examined the effect of film score on the emotional content of a film, other research has examined how film score can communicate an emotion even in the absence of the film.

**Film Score in the Absence of Film**

In further exploring the powerful relationship between film score and emotion, researchers considered the emotional effects of film score when separated from the film. Tagg and Clarida (2003a) investigated whether listeners would consistently and subjectively characterize a film score with the qualities of the images for which it was written. Researchers asked healthy adults to associate the musical theme of the television series *Miami Vice* (Hammer, 1984) with abstract qualities of what they felt the music depicted without seeing the cinematic images. Authors encouraged participants to associate the score with moods, pictures, scenarios, and actions, and explain them in illustrative terms, instead of adjectives about mood or feelings. This study involved a set of 10 film scores, however *Miami Vice* will be discussed here because of its notable ability to communicate associations.

The majority of 105 healthy adults gave similar responses to the *Miami Vice* film score when making associations between the film score and abstract images (Tagg & Clarida, 2003b). All participants were unfamiliar with the television series and stated that the music suggested images related to urban environments, including aggression, excitement, and speed. The top three associations that appeared most often in participants’ responses were “clubs, cars, and chasing” (Tagg & Clarida, 2003b, p. 642).
Participants’ responses characterized the theme as predominantly masculine and action-oriented; however, they found overtones of fashion and beauty in the film score. Furthermore, participants’ responses completely lacked mention of romantic love.

This research demonstrates how music employs the power of suggestion to create meaning and portray emotion, in this case, excitement (Tagg & Clarida, 2003b). Moreover, the research shows that moods are communicated from within film score, separate from its intended images. The researchers’ conclusions begin to reveal how film music alone becomes representative of emotion and meanings. While this study focused on abstract qualities associated with a film’s musical theme, another study explored the communication of targeted emotions in film score.

To further assess the emotional representation of film score, Eerola and Vuoskoski (2011) examined if film score could represent a particular emotion separate from film. The relevant aim of this listening study was to compile a reliable set of music stimuli for research in music and emotional processing. The authors specifically chose film score because of its ability to convey emotion and powerfully mediate emotional cues.

In a pilot study, a team of musicologists selected 360 film score excerpts that were generally representative of selected target emotions; happiness, sadness, tenderness, fear and anger. The panel further rated the selected excerpts for the target emotions, as well as levels of familiarity, valence, tension arousal, and energy arousal. Researchers extracted 110 of the 360 film scores based on being rated by the panel as unfamiliar, as well as highly or moderately representative of the target emotions. Healthy adults then rated 50 of the 110 film score excerpts of the playlist for their perceived emotion. All participants rated each film score excerpt with no given information on the targeted response.
Participants only rated 50 film scores for a target emotion; the remaining 60 film score excerpts were rated for their valence, tension arousal and energy arousal.

When participants rated the film score excerpts that were previously identified as highly representative of a target emotion, the participant’s perceived emotion of the excerpt matched the target emotion to a highly significant degree (Eerola & Vuoskoski, 2011). Moderately representative film score excerpts, however, were confused with one or two non-targeted emotions to a significant degree. For example, if the target emotion of a film score was happiness, some participants perceived sadness or tenderness in the moderately representative excerpt. Eerola and Vuoskoski (2011) demonstrated film scores’ ability to represent an emotion by statistically validating emotional representation in multiple film scores. The researchers next evaluated emotional induction using one experimenter-chosen film score.

Vuoskoski and Eerola (2012) examined whether various experiences, including listening to sad music, could provoke sadness in the listener, and to what measure empathy affected the results. Researchers assessed healthy adults for affective state using the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988), and empathy using the Interpersonal Reactivity Index (IRI) (Davis, 1980). After sad mood induction, participants recalled words from the PANAS, and then judged a set of 25 facial expressions. The authors predicted participants would recall more affect-incongruent words, or more positive words than negative when in a sad emotional state in an attempt to regulate mood. By contrast, research shows that mood states create bias in decision-making, especially in ambiguous situations; therefore participants should make...
affect-congruent facial judgments in a sad emotional state (Bower, 1981; Isen & Shalker, 1982; Bouhuys, Bloem & Groothuis 1995; Rusting, 1998).

Participants who wrote about an incident that made them feel extremely sad recalled significantly more positive than negative words from the PANAS than participants in other mood induction conditions. When participants actively listened to an unfamiliar, sad film score, those who were highly empathic had significantly higher sadness ratings in the facial judgment task than participants who completed other forms of sadness induction (Vuoskoski & Eerola, 2012). Participants who listened to self-chosen sad music, in addition to those who wrote about a sad incident, had significantly higher ratings of sadness when rating the facial expressions than participants who listened to orchestral music or film score.

These results suggest that sadness is induced when the sad music is both familiar and self-selected for all individuals regardless of empathy level (Vuoskoski & Eerola, 2012). By contrast, when the sad music is unfamiliar, only highly empathic individuals are truly induced with sadness. The use of an unfamiliar film score to induce an emotion in the listener highlights the significance of the listener’s innate sensitivity toward the film score’s emotion-inducing effectiveness. In addition, participants wrote about induced imagery and memories that occurred in the music listening condition following the facial judgment task. With unfamiliar music, 76% of listeners reported some type of sad imagery, sad memories, or imagery and sadness in general, while participant-chosen music evoked this response in 90% of listeners. Film score’s ability to represent emotion has also led researchers to explore this effect on cognitive processes.

In a recent study, Gold, Frank, Bogert, and Brattico (2013) investigated the
emotional influence of film score and subsequent cognitive effects by having participants listen to film score during reward-based learning. Healthy volunteers listened to their choice of film score during a computer-based probabilistic learning task, which involved learning to identify acceptable visual images based on immediate feedback.

Participants who listened to a pleasurable film score during the learning task performed significantly more accurately on the learning task than those who listened to a neutral film score (Gold et al., 2013). Moreover, participants who listened to a pleasurable film score had significantly shorter reaction times for responding during the task than those who listened to a neutral film score. The researchers demonstrate that film score can produce a pleasurable emotion, and when listening to film score while completing a cognitive task, the listener will perform better on the task.

The authors hypothesized that pleasurable music listening enhances task performance by acting on the dopaminergic reward system (Gold, et al., 2013). Researchers predicted that the learning task would activate the nucleus accumbens and the ventromedial prefrontal cortex, which are key structures involved in dopamine activity and the reward system. Research shows that listening to pleasurable music produces a pleasure response that activates dopamine release in the brain’s reward system (Blood & Zatorre, 2001; Blood et al., 1999; Menon & Levitin, 2005; Salimpoor et al., 2011). These results led the researchers to the assumption that listening to a pleasurable film score most likely activated dopamine release, enhancing the performance of the stimulated brain areas of the reward system.

Film score is written with intentions of clarifying and communicating emotion depicted in film. However, film score’s influence on emotion extends beyond the film.
The above research shows that film score can communicate emotion and modify mood in the absence of film. Moreover, musically-induced positive mood tends to enhance cognitive functioning and performance. Therefore, film score’s ability to guide emotion could extend to cognitive processes such as self-talk. Because emotion determines the direction of self-talk, potentially, the film score’s emotional influence on the listener will then shape the nature of the individual’s self-talk.

**Emotion and Cognition: Self-Talk**

Psychologist Albert Ellis’ theory of rational psychotherapy emphasizes that emotion and thought are highly interconnected, defining emotion as “a biased, prejudiced, or strongly evaluative kind of thinking” (Carlson & Knaus, 2013; pg. 7). The relationship between thinking and emoting is cyclical in that a person’s line of thinking can heavily influence his or her emotions and vice versa. Ellis’ awareness of this relationship and the human propensity to create language led to his idea that emotions and thoughts frequently manifest as self-talk.

The cyclical relationship between emotion and thought is further demonstrated as researchers find links between affect and self-talk. Fredrickson (2013) posits that emotion is a response to a change in one’s interpretation of an environmental situation. That change in the appraisal pattern triggers an emotion, which elicits a thought-action tendency that can lead to the identification of a coping strategy such as self-talk. For example, a negative emotion, such as fear, is perceived as unpleasant and initiates a fight or flight response (Tenenbaum, Edmonds & Eccles, 2008). In contrast, positive emotions such as joy, inspiration, and hope, provide access to a greater range of insights, thoughts, and actions, generating an enlarged “scope of awareness” (Fredrickson, 2013; pg. 15).
This expanded mindset allows for the detection of new skills and knowledge as needed for coping.

Positive emotions, therefore, build cognitive resources used in times of emotional or psychological distress to strengthen one’s ability to cope and increase the likelihood of experiencing positive emotions in the future (Fredrickson, 2013; Ong, Bergeman, Bisconti & Wallace, 2006; Tugade & Fredrickson, 2004; Zatura, Johnson & Davis, 2005). These cognitive resources may include self-talk, a coping skill commonly used to regulate emotions.

Self-talk is one of many forms of intrapersonal communication and is defined as the collection of statements directed to oneself that can occur in the form of thought or speech (Carlson & Knaus, 2013; Oliver et al., 2010). People use self-talk as a mental strategy for coping and motivation when presented with stressful or challenging situations, such as learning difficult concepts or complex motor movements. Researchers identify different types of self-talk; however, research traditionally uses the categories of positive and negative (Tod, Hardy & Oliver, 2011). Most other terms used to describe self-talk are either synonymous with these two categories or modified to apply to a specific field, such as sports medicine. In a pioneering study, Oliver et al. (2010) further defined categories of self-talk as informational or controlling.

Informational self-talk focuses on increasing self-efficacy without limiting oneself to a specific route to success (Oliver et al., 2010). Instead, those who use informational self-talk inspire themselves by seeking multiple possibilities to accomplish a cognitive, physical, social, or emotional goal. For example, using positive, informative self-talk when struggling to learn a mathematical concept might sound like "I don’t understand
this now, but I didn’t understand the last concept at first and now I do…I just need a chance to study or get a tutor, I’ll be fine.” This way of motivating oneself fulfills psychological needs to be autonomous, competent, and connected, leading to healthy mental and emotional well-being.

In contrast, negative controlling self-talk applies criticism to personal inadequacies to fit a specific externally-constructed approach to success, which reduces one’s sense of autonomy and competence (Oliver et al., 2010). In this same mathematical example, the student using controlling self-talk might attribute the difficulty in comprehension to a personal inadequacy. This process may include self-deprecating statements; such as “I don’t think this way, my brain just doesn’t do this and if I don’t get this I’ll never graduate,” leading to distress. This distress triggers the cyclical relationship of negative affectivity and self-talk, whereby a negative mood provokes controlling self-talk which reinforces the negative mood.

Research validates the effect of self-talk in lowering negative affect in self-critical adults and increasing positive emotions over time, thus establishing a reverse effect on the cycle of negative emotion and controlling self-talk (Fredrickson, 2013; Kelly, Zuroff & Shapira, 2009). Considering the effect self-talk has on both positive and negative emotions, researchers have further examined the link between affect and self-talk in response to a potential stressor.

Oliver et al. (2010) investigated connections between affect and self-talk following a challenging educational lecture that was considered stressful by college students. The authors proposed that informational self-talk would be positively correlated with positive affect and that controlling self-talk would be positively correlated with
negative affect. Following the lecture, researchers asked participants to write down three thoughts that occurred most often during the lecture. Participants then rated each thought using indicators of informational and controlling self-talk provided by the researchers. Afterward, the participants completed the PANAS (Watson et al., 1988) to measure positive and negative affect, and reported on the level of confidence in their understanding of the material and overall experience of the lecture as positive or negative.

The authors found significantly positive correlations between informational self-talk and positive affect, regardless of the participant’s lecture experience. Additionally, a significant interaction between controlling self-talk, a negative lecture experience, and negative affect emerged, thus further confirming a relationship between affect and self-talk. A negative lecture experience predicted negative affect only when participants reported higher levels of controlling self-talk usage.

**Summary of the Literature Review**

Stressors are prevalent among college students. In the event of a stressor, such as a challenging lecture, loneliness, or a financial difficulty, an individual will experience an emotional reaction. During or after this emotional experience, the individual will employ a coping mechanism, such as self-talk, which can influence affectivity. Negative affectivity is linked to depression, anxiety, and poor performance. These consequences can lead to a myriad of negative outcomes, including difficulties with critical thinking, decision-making, and problem-solving. Emotion regulation is key to preventing these outcomes. Music listening can potentially act as a tool to aid in emotion regulation. The
overlap of brain areas activated during both music listening and emotional processing further supports the role of music in emotion regulation.

Both advanced and primitive brain regions mediate emotional experience, expression, and regulation. Papez (1937) identified a neural circuit involving the thalamus, hypothalamus, anterior thalamus, hippocampus; as well as higher brain regions such as the cingulate and sensory cortices. The amygdala, insula, subcallosal cingulate cortex and orbitofrontal cortex are also linked with the experience of specific emotions such as fear, disgust, sadness and regulation, respectively.

Music listening activates many of the same brain areas that are active during emotional processing, including the insula, amygdala, orbitofrontal cortex, and the subcallosal and anterior cingulate cortices, in addition to the areas identified by Papez. Because music listening stimulates the same brain areas needed for emotional processing, the emotions induced by music listening are the same emotions processed during a non-musical emotional experience. This neural overlap creates support for music listening as a tool for emotion regulation.

Music written to influence the emotional experience of a film audience is called film score. An audience will determine the emotional nature of a narrative according to the mood of the film score. Even when film score has been separated from the visual component, listeners consistently identify the music’s mood with that of the composer’s intentions. Therefore, based on the limited amount of research published, film score consistently and intentionally conveys specific emotions to its listeners. The emotional influence of film score can elicit a change in affectivity, which can lead to a change in cognition.
Affectivity creates bias in one’s thinking, which in turn can further influence emotion. This cyclical relationship between emotion and thought may extend to self-talk. Self-talk is regulatory communication with oneself, usually in regard to the interpretation of and motivation in one’s daily activities. An individual in a positive mood is likely to interpret a stressful situation more optimistically, using informational self-talk, which reinforces the positive mood. In contrast, managing a stressor while in a negative mood tends to produce controlling self-talk, which can worsen the negative mood. Because film score has the ability to shift the mood of a listener, it can potentially shape thought processing. Ultimately, film score is predesigned with emotional intent, and therefore will likely be more advantageous in emotion regulation and self-talk.

Researchers have used film score as an instrument in exploring the influence of music listening on mood. However, very little published research examines the specific influence of film score on mood, or the effects of film score on mood and subsequently cognition. More importantly, no published research exists on the relationship between film score, mood, and self-talk. The present study would address this deficit in the literature, as well as expose the potential relevance of film score to the field of music therapy. See Figure 1 for a diagram of the proposed relationship between emotions, film score and self-talk.

**Research Questions:**

1. What is the effect of film score on mood?

2. What is the relationship between mood change induced by film score and the content of self-talk following a stressful event?
Figure 1. Diagram of the proposed relationship between emotions, film score, and self-talk. Ultimately, film score is predesigned with emotional intent, and therefore will likely be more advantageous for emotional response and subsequent self-talk.
Chapter 3

Method

This chapter includes a description of the participants, materials and measures that were used in this study. An explanation of the procedure, experimental design and variables are revealed here. The procedure explored relationships between the constructs of film score, mood and self-talk in response to a stressor. This study replicated portions of research conducted by Oliver et al. (2010) regarding the relationship between mood and cognitive coping mechanisms, such as self-talk.

Participants

Participants were 131 University of Miami undergraduate students between the ages of 18 and 24 who were not musicians. Students were recruited from all departments of study, excluding the Frost School of Music. Both male and female students had equal opportunity for participation, regardless of ethnicity. However, all participants were required to speak and read English. Participants from the Department of Psychology received course credit for research completion, and all participants received a $1 scratch-off lottery ticket as an incentive.

This study excluded musicians, regardless of major, because of the known differences in the processing of emotions in music between musicians and non-musicians (Koelsch, Fritz, Schulze, Alsop & Schlaug, 2005; Peretz & Zatorre, 2005). Previous research supports the use of participants with fewer than five years of private or academic music instruction in order to avoid musician’s bias (Lucas, Shubert and Halpern, 2010; Mohn, Argstatter and Wilker, 2011). Thus, to avoid effects on mood induction,
musicianship was defined as having no more than five years of music classes or lessons at either the high school or collegiate level.

Materials

Film score excerpts. Materials included film scores from suggested film scorers and films chosen specifically to convey a negative or positive mood (C. Boardman, personal communication, August 2014, November 2014; R. Murciano, personal communication, November 2014). As explained in Chapter 2, the term “film score” in this study refers to instrumental music composed specifically for the movie. Film music that includes lyrics was excluded because it may complicate the emotional response. With the introduction of lyrics, the anticipated mood changes could be a result of the instrumental content or the content of the words. The current study was not designed to differentiate between these correlations and would thus fail to answer the intended research questions. The final film scores were selected through a three-step process: research and initial selection, panel validation, and final selection.

Research and initial selection. The researcher searched for film score within the film genre “drama.” These films usually have moments of both depressing and inspiring emotional intensity (C. Boardman, personal communication, August 2014, November 2014; R. Murciano, personal communication, November 2014). The protagonist of a typical dramatic plot is usually experiencing an emotional journey throughout the film. The present researcher selected film scores for two sets of music intended to induce positive or negative mood. The negative excerpts portrayed sadness and/or loss, while the positive excerpts portrayed happiness and/or encouragement. Researching the suggested films and film scorers resulted in the selection of 12 potential film scores.
**Positive film scores.** The researcher initially chose seven positive pieces ranging in length from 21 seconds, to 10 minutes and 10 seconds each. The researcher selected scores with majestic musical swells in major keys, ascending melodic movement and the use of brass instruments, especially trumpet, as these musical properties tend to signal happiness or inspiring moments in a film (Boltz, 2004; C. Boardman, personal communication, August 2014, November 2014; Ellis & Simons, 2005; Green, 2010; R. Murciano, personal communication, November 2014).

**Negative film scores.** The researcher initially selected five negative film scores ranging in length from 47 seconds, to 6 minutes and 17 seconds each. The researcher selected negative scores that used minor keys and chords, mostly dissonant tones, descending melodic movement, and sustained tones of stringed instruments, as these musical properties tend to signal loss or depression within a film (Boltz, 2004; C. Boardman, personal communication, August 2014, November 2014; Ellis & Simons, 2005; Green, 2010; R. Murciano, personal communication, November 2014).

**Panel validation.** For validation of film score selections, a panel of eight musicians and non-musicians assessed the researcher-selected music for portrayal of the intended mood (i.e., positive or negative). The panel consisted of three musicians and five non-musicians ranging in age from 19 to 70 years old. Each panelist listened to three or four of the potential scores depending on the length of the music, given in a combination of negative and positive pieces. The researcher designed score assignments so that each panelist judged approximately the same length of music. Analyzing all 12 scores by each panelist would have involved long periods of emotional engagement. This
process presented a potential challenge for some of the panelists, as fatigue could have diminished the accuracy, and therefore reliability, of each judge’s responses.

Each panelist was asked to focus on the emotional content of each score and provide ratings in a two-part survey. The first part of the survey involved answering three questions concerning emotional content for each score. The second part of the survey asked two questions about recognition of the score or its film, and any reactions to the music. Each piece was rated by two panel judges and a third panel judge rated the piece when two panelists disagreed on the nature of its emotional content. Table 2 includes basic demographics of all eight panel judges. See Appendix A for the survey.

**Final Selection.** After panel validation, the researcher removed three pieces from the positive list of film scores. The first piece that was removed showed disagreement and inconsistencies in emotional ratings by the three judges. Moreover, the single consistency in those emotional ratings did not match the intentions of the researcher for this study. The second piece that was removed contained the same musical theme as another accepted piece; however, the accepted piece was longer and rated higher in terms of emotional consistency. The third piece was later removed to balance the duration of the positive list and the negative list. The researcher accepted all pieces in the negative list of film scores. See Appendix B for information on the removed film scores.

The positive film score list consisted of four scores ranging in length from 1 minute and 29 seconds, to 10 minutes and 10 seconds for a total length of 16 minutes and 21 seconds. The negative film score list consisted of five scores ranging in length from 47 seconds, to 6 minutes and 17 seconds for a total length of 15 minutes and 11 seconds. The length of each score was manipulated to ensure 15 minutes of listening time per list.
Table 3 provides information for the final edited positive film scores. Table 4 provides information for the final edited negative film scores.
<table>
<thead>
<tr>
<th>Name</th>
<th>Gender/Age</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judge 1</td>
<td>M/70</td>
<td>Retired</td>
</tr>
<tr>
<td>Judge 2</td>
<td>F/23</td>
<td>Musician</td>
</tr>
<tr>
<td>Judge 3</td>
<td>F/19</td>
<td>Plant Worker</td>
</tr>
<tr>
<td>Judge 4</td>
<td>M/30</td>
<td>Medical Doctor</td>
</tr>
<tr>
<td>Judge 5</td>
<td>M/32</td>
<td>Medical Student</td>
</tr>
<tr>
<td>Judge 6</td>
<td>F/54</td>
<td>Social Worker</td>
</tr>
<tr>
<td>Judge 7</td>
<td>M/29</td>
<td>Music Supervisor(^a)</td>
</tr>
<tr>
<td>Judge 8</td>
<td>F/26</td>
<td>Music Therapist</td>
</tr>
</tbody>
</table>

\(^a\)A music supervisor is a qualified professional who oversees all music related aspects of film, television, advertising, video games and other existing or emerging visual media platforms as required (Guild of Music Supervisors, n.d.).
<table>
<thead>
<tr>
<th>Score</th>
<th>Title</th>
<th>Year</th>
<th>Length (in secs)a</th>
<th>Scorer</th>
<th>Film</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>That Next Place</td>
<td>1998</td>
<td>10:09</td>
<td>Thomas Newman</td>
<td>Meet Joe Black</td>
</tr>
<tr>
<td>2</td>
<td>Navy Diver</td>
<td>2000</td>
<td>1:48</td>
<td>Ken Kugler</td>
<td>Men of Honor</td>
</tr>
<tr>
<td>3</td>
<td>Doc Returns</td>
<td>1990</td>
<td>2:50</td>
<td>Alan Silvestri</td>
<td>Back To The Future III</td>
</tr>
<tr>
<td>4</td>
<td>Victory</td>
<td>2013</td>
<td>1:13</td>
<td>Kajiura Yuki</td>
<td>Sword Art Online</td>
</tr>
</tbody>
</table>

aTotal unedited duration of this list is 16 minutes and 21 seconds; lengths given here reflect manipulation.
Table 4

*Negative Film Score – Final Edited Selections*

<table>
<thead>
<tr>
<th>Score</th>
<th>Title</th>
<th>Year</th>
<th>Length (in secs)</th>
<th>Scorer</th>
<th>Film</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>He’s Gone</td>
<td>1989</td>
<td>:47</td>
<td>Alan Silvestri</td>
<td><em>Back To The Future II</em></td>
</tr>
<tr>
<td>2</td>
<td>Home Sweet Home</td>
<td>2000</td>
<td>1:45</td>
<td>Marco Beltrami and Pete Anthony</td>
<td><em>Scream III</em></td>
</tr>
<tr>
<td>3</td>
<td>Memories of Childhood</td>
<td>2010</td>
<td>3:38</td>
<td>Alexandre Desplat</td>
<td><em>The King’s Speech</em></td>
</tr>
<tr>
<td>4</td>
<td>When The Sun Rises In The West</td>
<td>2011</td>
<td>2:40</td>
<td>Ramin Djawadi</td>
<td><em>Game of Thrones</em></td>
</tr>
<tr>
<td>5</td>
<td>Russia Under The Mongolian Yoke</td>
<td>1938</td>
<td>6:10</td>
<td>Sergei Prokofiev</td>
<td><em>Alexander Nevsky</em></td>
</tr>
</tbody>
</table>

* Total unedited duration of this list is 15 minutes and 29 seconds; lengths given here reflect manipulation.

* This piece runs 2 minutes and 3 seconds, however, the last 18 seconds were cut for the purposes of this study, leaving 1 minute and 45 seconds of music.

* Clark and Teasdale (1985) used this piece at half speed to successfully induce a depressed mood; the same altered version will be used for this study.
**Stressor video.** In the Oliver et al. (2010) study, researchers used a live lecture on research methods as an ethical stressor for the participants. Research identifies statistics and research methods as a source of considerable stress for undergraduate students (Ball & Pelco, 2006; Zeidner, 1991). For many majors, especially those involving the sciences, statistics and research methods classes need to be completed with a passing grade in order to continue the educational program. Moreover, undergraduates often consider these classes convoluted and highly technical.

In place of a live lecture, the participants of the present study watched a 30-minute lecture presented on DVD about the properties of statistics used in research. The chosen lecture was selected from the educational series, *Meaning from Data: Statistics Made Clear* (Starbird, 2006). The selected lecture, *Describing Dispersion or Measuring Spread*, gives information on the methods used to determine variability in data and the corresponding equations.

**Measures**

**Mood assessment.** Mood was evaluated with the Multiple Affect Adjective Check List - Revised (MAACL-R; Zuckerman & Lubin, 1985). The assessment consists of a checklist of 132 adjectives corresponding to five subscales: anxiety, depression, hostility, positive affect, and sensation seeking. The anxiety, depression and hostility subscales are combined to form an overall negative affect scale, known as Dysphoria. PASS, the overall positive affect scale, consists of two subscales: positive affect and sensation seeking. Psychologists typically use the MAACL-R to evaluate and diagnose mood disorders.
The present study used the state form of the MAACL-R as opposed to the trait form, in order to assess each participant’s current mood. The state form measures the current mood, while the trait form measures the participant’s general mood over a given period of time. The state and trait forms consist of the same adjectives, provided in the same manner. The only difference is in the instructions given at administration. For the state form, participants were instructed to check all adjectives that reflect how they currently feel.

Examples of words representing anxiety include “afraid,” “fearful,” and “nervous.” The depression subscale includes words such as “alone,” “discouraged,” and “lost.” Lastly, the hostility subscale includes words such as “angry,” “annoyed,” and “cruel.” These examples are included in the negative affect score, or Dysphoria. Words representing the positive affect subscale include “friendly,” “free,” “good-natured,” and “affectionate.” As part of the sensation seeking subscale; “active,” “adventurous,” “aggressive,” and “enthusiastic” are included in the checklist to exemplify this mood. These two subscales are used for the positive affect score, or PASS.

Each participant marked with an “X” every adjective from the checklist that indicated his or her current mood. By summing the number of adjectives checked, the MAACL-R provides a score for each subscale (Zuckerman & Lubin, 1985). These subscale scores are then combined accordingly for a composite score for dysphoria and a composite score for PASS (see Figure 1). The list of 132 adjectives of the MAACL-R includes words that are not scored, which are termed “buffers.” These 66 buffers are included to help ensure an authentic response.
Researchers typically convert raw scores to standard scores in order to compare collected data with the scores of the general population for diagnostic purposes. Since these data were collected to measure mood change and not for diagnosing mood, all comparisons were made using raw scores. A single mood change score was obtained by subtracting pre-mood induction scores from post-mood induction scores for dysphoria and PASS scales.

The MAACL-R has been used to assess short-term mood change in multiple studies (Cooper & McCormack, 1992; Ellenberger & King, 1990; Paris, 1993; Zuckerman & Lubin, 1985), with an administration time of approximately three to five minutes. While this assessment is available in both long and short forms, the long form was used for this study. The short form does not include the adjectives that are used to help control response manipulation (i.e., faking a good or bad mood). The MAACL-R demonstrates adequate internal reliabilities in college students with coefficients of .77 or higher for each subscale. In terms of validity, correlations between the MAACL-R and the PANAS scales (Watson et al., 1988) are high at the .001 significance level. These correlations compare PASS with the PANAS’ Positive Affect scale ($r = .62$) and Dysphoria with Negative Affect ($r = .77$).

**Self-Talk Questionnaire.** Self-talk was evaluated using a modified version of a questionnaire generated by Oliver et al. (2010) for research on informational and controlling self-talk. The self-talk (ST) questionnaire required participants to freely report three ST statements in response to a stressor, and subsequently rate them according to 14 evaluative items using a 5-point Likert scale. This scale ranges from 1 (not at all, meaning this statement was not at all encouraging), to 5 (very much so, meaning this
As a modification, the present researcher added descriptors for the middle numbers in order to standardize ratings across participants and control for differences in interpretation between participants. Thus, a score of 2 on the Likert scale indicated very little agreement, 3 reflected the idea that the participant is not sure their statement relates to this item, and 4 indicated quite a bit of agreement.

Oliver et al.’s (2010) original questionnaire included 17 evaluative items. After data analyses, Oliver et al. (2010) removed six evaluative items that did not consistently indicate a particular category of self-talk (i.e., informational vs. controlling). As a result, Oliver et al. (2010) found 11 evaluative items that could be used to categorize ST statements as informational (7 evaluative items) or controlling (4 evaluative items). To balance the number of controlling evaluative items with the number of informational evaluative items, the present researcher collaborated with Oliver (E. Oliver, personal communication, January, 2015) to create three additional controlling evaluative items.

Thus, the seven informational evaluative items used in the current study included:

1. Made me feel I was in control
2. Was encouraging
3. Made me feel more in charge
4. Assisted my understanding
5. Provided me with positive feedback
6. Helped reduce the pressure I put on myself
7. Reassured me that I was in control

The seven controlling evaluative items used in the current study included:
1. Made me feel pressured
2. Made me feel I had no choices
3. Was critical
4. Made me feel I had no control over the situation
5. Told me the way I had to do the task
6. Put me under pressure to succeed
7. Made me feel I must do well at the task

These 14 evaluative items were presented in a mixed order.

For the present study, each participant wrote three ST statements that occurred most often during a 30-minute stressor. Each participant then used the 5-point Likert Scale to determine the level of agreement between each ST statement and each of the 14 evaluative items. For example, a participant might have written the ST statement: “you can do this.” The participant would then indicate how well this ST statement agreed with the first evaluative item “Made me feel I was in control” using the 5-point Likert Scale. A score of “5” would indicate the highest level of agreement. The participant would continue indicating the level of agreement in this manner for the remaining 13 evaluative items. Subsequently, the participant would evaluate the remaining two ST statements using the same process. See Appendix C for this questionnaire.

**Scoring.** Scoring of the ST questionnaire was structured around the two types of self-talk: informational or controlling. For each ST statement, the researcher calculated the average Likert score for all seven informational evaluative items. As a result, a mean informational ST score was obtained for each ST statement. These three means were then used to calculate a grand mean for informational content of all three ST statements. This
procedure was repeated for all seven controlling evaluative items. This scoring process yielded one grand mean score for informational ST, and one grand mean score for controlling ST, ranging from 1 to 5. If informational self-talk had a larger grand mean, the overall characteristic of the ST statements was considered informational. However, a larger grand mean for controlling self-talk indicated that the ST statements were mostly controlling. See Figure 2 for scoring information.
**Figure 2.** Self-talk questionnaire scoring. This scoring is based on means and grand means calculated from the 5-pt Likert Scale ratings. The researcher compared the two resulting grand means.

<table>
<thead>
<tr>
<th>ST Statement 1</th>
<th>ST Statement 2</th>
<th>ST Statement 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Informational ST</strong></td>
<td>Calculate mean of 5-pt Likert Scale Ratings for 7 Informational Evaluative Items</td>
<td>Calculate mean of 5-pt Likert Scale Ratings for 7 Informational Evaluative Items</td>
</tr>
<tr>
<td><strong>Controlling ST</strong></td>
<td>Calculate mean of 5-pt Likert Scale Ratings for 7 Controlling Evaluative Items</td>
<td>Calculate mean of 5-pt Likert Scale Ratings for 7 Controlling Evaluative Items</td>
</tr>
</tbody>
</table>

Calculate grand mean of 3 means for Informational content.
**Lecture Assessment.** In order to gauge how stressful the lecture was perceived to be, participants completed a 3-question lecture assessment. The questions included an assessment of the level of stress experienced during the lecture, the level of confidence each participant had in his or her understanding of the lecture material, and each participant’s overall experience during the lecture. All three questions were answered using a 4-point Likert scale, anchored with 1 (“Not At All Stressful,” “Not At All Confident,” or “Very Negative”) and 4 (“Very Stressful,” “Very Confident,” or “Very Positive”). A 4-point scale compelled the participant to commit to the perspective that it was stressful or that it was not (M. Suarez, personal communication, January 20, 2015). See Appendix D for this assessment.

**Design and Variables.** A 3x2 independent measures factorial design was used for this study. To investigate the first research question, the researcher observed the effect of the independent variable (i.e., positive or negative film score, or control) on the dependent variable mood (i.e., positive or negative). For the second research question, the researcher assessed any correlations between change in mood and self-talk (i.e., informational and controlling).

**Procedure**

Undergraduate students were recruited from the Department of Psychology via study advertisement. Undergraduates from other departments were recruited by written or spoken study advertisements in class and on University-specific social media. Each participant met with the researcher one time for approximately one hour. Meetings took place in study rooms located in the Otto G. Richter Library and Marta and Austin Weeks Music Library. These meetings were conducted individually and in groups. Following a
brief introduction to the study, the participant read and signed an informed consent form. See Appendix E for the informed consent form. A visual representation of the procedural sequence of events for data collection can be found in Figure 3.

**Mood Induction.** Participants were randomly assigned to groups based on the three levels of the independent variable: positive film score, negative film score, and control. In the positive film score group, participants listened to the film score excerpts that depict feelings of happiness and/or encouragement for 15 minutes. Participants who were assigned to the negative film score group listened to film score excerpts that portray feelings of sadness, loss and/or disappointment for 15 minutes. Those participants who were assigned to the control group listened to a 15-minute recording of naturally-occurring sounds from a classroom, which is a typical and familiar environment. The researcher chose these sounds to avoid unintentional mood induction while still providing an auditory stimulus (B. Zwibelman, personal communication, October 2014).

A MacBook Pro™ with a Bluetooth Bose™ speaker was used to present the audio for all participants. Participants in both the experimental and control groups took part in a mood induction procedure, which proceeded as follows:

1. The participant completed the MAACL-R, to establish an initial mood state. The researcher instructed participants to “mark every adjective that indicates or reflects how you currently feel.”

2. This step was divided between the experimental groups and the control group.
   a. The researcher then instructed the participant to “determine the mood of the music” and then “move yourself into the mood of the music” (de l’Etoile, 2014). Often, more than the presentation of music is required
for a participant to experience the intended mood. These particular instructions encouraged active listening by whatever means necessary for proper mood induction. Participants in these experimental groups (positive vs. negative film score) were prohibited from performing any other tasks during listening (i.e., no cell phone use, no laptop use, no reading, etc.).

b. Participants assigned to the control group were instructed to listen to the sound clip of naturally-occurring classroom sounds. This sound clip was not intentionally mood inducing. Participants in this group were prohibited from performing any other tasks.

3. The participant then listened to the auditory stimulus as assigned.

4. After the mood induction phase, the participant completed the MAACL-R for a second time.

Stressor. Emulating the protocol in Oliver et al. (2010), all participants were assessed for mood prior to a stressor. These researchers, based on prior studies (Ball & Pelco, 2006; Zeidner, 1991), chose a lecture on research methods to function as a sufficient, yet ethical, stressor for research participants. The present researcher used the following stressor: a research methods lecture from an educational DVD on understanding data statistics, which lasted approximately 30 minutes (Starbird, 2006).

Deception. Prior to the stressor, the present researcher informed participants that an exam on the lecture material must be completed with a high passing score (85%) in order to qualify for any incentive. This statement was meant to intensify the level of stress experienced during the lecture for all participants. This increase in stress was
necessary to make this study valid and reliable. After all assessments were completed, the researcher informed participants that no exam would be given and full participation in this study was the only criteria needed for the incentive. See Figure 3.

**Ad hoc mood induction.** Those participants who were assigned to the negative film score group had the option of receiving positive mood induction before departure, after the study procedure. Participants in the negative film score group may have needed assistance when shifting to a more positive mood.

*Figure 3. A visual representation of the procedural sequence of events for data collection.*
**Statistical Analysis.** A one-way analysis of variance (ANOVA) was used to investigate the effect of film score on mood. This test was appropriate because the independent variable was defined by three levels, including positive film score, negative film score, and control. Additionally, the data collected for the dependent variable, change in mood, yielded a continuous number from the MAACL-R scores (M. Suarez, personal communication, January 2015). The ANOVA involves a between-subjects variable (i.e., participants were placed in three independent groups), a within-subjects variable (i.e., participants were tested twice for mood change), and identified the main effects of film score on mood.

In order to determine mood change, mood was assessed twice. The pre-mood induction score was subtracted from the post-mood induction score. The researcher used four Pearson’s $r$ correlation coefficients to assess the relationship between mood change and type of self-talk. One correlation explored associations between mood change and self-talk for all participants, while the other three correlations examined associations between mood change and self-talk for each condition individually.
Chapter 4

Results

Participants

This study involved 131 undergraduate college students from the University of Miami, including 89 women and 42 men who ranged in age from 18 to 24 years (mean age 18.9). Sixty-seven of the participants were Caucasian, 29 were Hispanic, 18 were African American, 13 were Asian, 1 was Native American, 1 was Egyptian, and 1 was Middle Eastern. None of the participants had studied music for more than 5 years. See Table 5 for more information.

Research Question #1: What is the effect of film score on mood?

This study included three mood induction conditions: positive film score, negative film score, and control. Mood was measured twice with the Multiple Affect Adjective Check List - Revised (MAACL-R) (Zuckerman & Lubin, 1985) using its two subscales, dysphoria (negative mood) and PASS (positive mood). By summing the scores of the anxiety, depression and hostility subscales, dysphoria produces a possible score between 0 and 37. Likewise, by summing the scores of the positive affect and sensation seeking subscales, PASS produces a possible score between 0 and 33.

The investigator predicted that participants in the negative film score mood induction condition would show an increase in dysphoria scores as well as a decrease in PASS scores, demonstrating the influence of negative film score. Of 49 total participants in the negative mood induction condition, 53% reported increases in dysphoria.
Table 5

Demographics (n = 131)

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>89</td>
<td>67.9</td>
</tr>
<tr>
<td>Males</td>
<td>42</td>
<td>32.1</td>
</tr>
<tr>
<td><strong>Age (in years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>62</td>
<td>47.3</td>
</tr>
<tr>
<td>19</td>
<td>43</td>
<td>32.8</td>
</tr>
<tr>
<td>20</td>
<td>14</td>
<td>10.7</td>
</tr>
<tr>
<td>21</td>
<td>7</td>
<td>5.3</td>
</tr>
<tr>
<td>22</td>
<td>4</td>
<td>3.1</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>.8</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>18</td>
<td>13.7</td>
</tr>
<tr>
<td>Asian</td>
<td>13</td>
<td>9.9</td>
</tr>
<tr>
<td>Caucasian</td>
<td>67</td>
<td>51.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>29</td>
<td>22.1</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>.8</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Prefer Not to Answer</td>
<td>1</td>
<td>.8</td>
</tr>
</tbody>
</table>
Moreover, 82% of the total participants in the negative mood induction condition showed a decrease in PASS scores. Forty-one percent of participants in the negative mood induction condition shifted in the desired direction for both PASS and dysphoria. Another result from the negative mood induction condition involved participants who increased in PASS change scores and decreased in dysphoria mood change scores after listening to negative film score. Thirty-one percent of the 49 total participants in this group showed this direction of mood change. See Table 6 for these percentages.

The investigator predicted that participants in the positive film score mood induction condition would have increased PASS scores and decreased dysphoria scores, reflecting a positive mood change due to the influence of positive film score. Seventy-one percent of participants who listened to positive film score showed an increase in PASS scores. Furthermore, 46% of participants who listened to positive film score showed a decrease in dysphoria scores. Of the 41 total participants in the positive mood induction group, 37% moved in the desired direction of change in mood for both scales. Also, 15% participants who listened to positive film score reported a decrease in PASS scores and an increase in dysphoria scores. One participant reported no change in PASS and dysphoria scores. See Table 7 for these percentages.
Table 6

*Percentages of Participants’ Change in Mood Due to Negative Film Score*

<table>
<thead>
<tr>
<th>Negative Film Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=49</td>
</tr>
<tr>
<td>Increase in Dysphoria</td>
</tr>
<tr>
<td>Decrease in PASS</td>
</tr>
<tr>
<td>Increase in PASS</td>
</tr>
<tr>
<td>Decrease in Dysphoria</td>
</tr>
<tr>
<td>Increase in Dysphoria and Decrease in PASS (both changes)</td>
</tr>
</tbody>
</table>

*Note: These categories included the same participants, showing both increases and decreases as indicated. One participant reported no change in PASS and dysphoria scores.*

Table 7

*Percentages of Participants’ Change in Mood Due to Positive Film Score*

<table>
<thead>
<tr>
<th>Positive Film Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=41</td>
</tr>
<tr>
<td>Increase in Dysphoria</td>
</tr>
<tr>
<td>Decrease in PASS</td>
</tr>
<tr>
<td>Increase in PASS</td>
</tr>
<tr>
<td>Decrease in Dysphoria</td>
</tr>
<tr>
<td>Increase in PASS and Decrease in Dysphoria (both changes)</td>
</tr>
</tbody>
</table>

*Note: These categories included the same participants, showing both increases and decreases as indicated. One participant reported no change in PASS and dysphoria scores.*
In regard to all three mood induction conditions, participants in the control condition, who listened to a recording of classroom sounds, reported dysphoria scores that increased by a mean of 1.88 (SD 3.1), and showed a decrease in PASS scores of 5.34 (SD 4.6) on average. In contrast, in the negative film score condition, dysphoria increased by an average of 1.37 (SD 5.3), while the PASS score decreased by a mean score of 3.63 (SD 5.2). Participants in the positive film score condition decreased dysphoria scores by a mean of 1.22 (SD 3.3), while PASS scores increased by a mean of 2.98 (SD 5.5). See Tables 8 and 9 for more information.

Table 8

*Dysphoria Scores of the MAACL-R*

<table>
<thead>
<tr>
<th>Mood</th>
<th>Positive Film Score</th>
<th>Negative Film Score</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=41</td>
<td>N=49</td>
<td>N=41</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>Range</td>
</tr>
<tr>
<td>Pre-Test Scores</td>
<td>1.9</td>
<td>3.3</td>
<td>18</td>
</tr>
<tr>
<td>Post Test Scores</td>
<td>0.68</td>
<td>1.4</td>
<td>5</td>
</tr>
<tr>
<td>Change Scores</td>
<td>-1.22</td>
<td>3.3</td>
<td>22</td>
</tr>
</tbody>
</table>

*Note.* Possible Dysphoria scores can range between 0-37.
Table 9

Positive Affect Sensation Seeking (PASS) Scores of the MAACL-R

<table>
<thead>
<tr>
<th>Mood</th>
<th>Positive Film Score</th>
<th>Negative Film Score</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=41</td>
<td>N=49</td>
<td>N=41</td>
</tr>
<tr>
<td>N=41</td>
<td>M  SD Range</td>
<td>M  SD Range</td>
<td>M  SD Range</td>
</tr>
<tr>
<td>Pre-Test Scores</td>
<td>8.68 5.1 19</td>
<td>8.96 5.4 24</td>
<td>9.56 5.4 24</td>
</tr>
<tr>
<td>Post Test Scores</td>
<td>11.66 6 23</td>
<td>5.33 4 18</td>
<td>4.22 3.2 17</td>
</tr>
<tr>
<td>Change Scores</td>
<td>2.98 5.5 30</td>
<td>-3.63 5.2 27</td>
<td>-5.34 4.6 18</td>
</tr>
</tbody>
</table>

Note. Possible PASS scores can range between 0-33.

The investigator conducted a one-way analysis of variance to compare average change scores for dysphoria, as well as change scores for PASS, between the three mood induction conditions. Levene’s test for homogeneity of variances was used to verify the assumption that variance across all samples or groups was equal (Levene, 1960). For data analysis on dysphoria score changes, Levene’s test was not significant \([F(2,128)=2.13, p>0.05]\) thus the assumption of homogeneity of variances was met. Results from the one-way ANOVA indicated that the different mood induction conditions resulted in significantly different change scores for dysphoria \([F(2,128)=6.82, p=.002]\). Further, \(\eta^2=0.10\) indicated that 10% of the variance in the participants’ change in negative mood was explained by the condition of mood induction. Observed power for these analyses was \(\beta=0.92\); indicating a 92% chance of finding any existing effects.

As a post-hoc analysis, the Tukey HSD was used to compare the mean differences of the different mood induction conditions for significant effects. The analysis showed a significant difference in dysphoria change scores between the control condition and the positive mood induction condition \((MD=3.1, SE=.91, p=.002)\). To explain, dysphoria
change scores increased in the control condition, and decreased in the positive film score condition. The difference in scores was statistically significant. The analysis further revealed a significant difference in dysphoria change scores between negative mood induction and positive mood induction ($MD=2.59, SE=.87, p=.01$). To clarify, dysphoria scores increased in the negative film score condition, while these scores decreased in the positive film score condition. This difference in scores was statistically significant.

Participants in the control condition showed a greater increase in dysphoria scores than in the negative mood induction condition, but no statistically significant differences were found ($MD=.51, SE=.87, p=.83$). These results demonstrate a main effect of mood induction condition on dysphoria scores in this sample. See Table 10 for ANOVA results on change in negative mood.

Table 10

*One-Way Between Subjects Analysis of Variance for Change in Negative Mood (DYS) Across Mood Induction Conditions*

<table>
<thead>
<tr>
<th>Source</th>
<th>$SS$</th>
<th>$df$</th>
<th>$MS$</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood Induction Conditions</td>
<td>229.75</td>
<td>2</td>
<td>114.87</td>
<td>6.82</td>
<td>.002*</td>
<td>.10</td>
<td>.92</td>
</tr>
<tr>
<td>Error</td>
<td>2154.8</td>
<td>128</td>
<td>16.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2384.55</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. *Significant at the $p < 0.05$.

For analysis of PASS score changes, Levene’s test was not significant $[F(2,128)=0.70, p=.50]$; thus the assumption of homogeneity of variances was met. As shown in Table 7, the one-way between subjects ANOVA indicated that the different
mood induction conditions resulted in significantly different change scores for PASS 
$[F(2,128)=30.56, p<.001]$. Furthermore, $\eta^2=0.32$ indicated that 32% of the variance in 
participants’ change in PASS score was explained by mood induction condition.
Observed power for these analyses was $\beta=1.00$; indicating a 100% chance of finding an 
effect if one existed.

Post-hoc tests using Tukey’s HSD revealed a significant difference in PASS 
scores ($MD=8.32, SE=1.13, p<.001$) between positive mood induction and the control 
condition. Participants in the control mood induction condition showed a decrease in 
PASS scores, while participants in the positive mood induction condition showed an 
increase. This difference was statistically significant. Additionally, a significant 
difference in PASS change scores emerged between the positive and negative mood 
induction conditions ($MD=6.61, SE=1.08, p<.001$). Participants in the positive mood 
induction condition showed an increase in PASS scores, while participants in the 
negative mood induction condition showed a decrease. This difference in scores was 
statistically significant.

Participants in the control condition showed a larger decrease in PASS change 
scores than in the negative film score condition, but no statistical significance was found 
($MD=1.71, SE=1.08, p=.26$). These results show a main effect of mood induction 
condition on PASS scores in this sample. See Table 11 for ANOVA results on change in 
positive mood.
Table 11

*One-Way Between Subjects Analysis of Variance for Change in Positive Mood (PASS) Across Mood Induction Conditions*

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>(\eta^2)</th>
<th>power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood Induction Conditions</td>
<td>1602.13</td>
<td>2</td>
<td>801.06</td>
<td>30.56</td>
<td>.000**</td>
<td>.32</td>
<td>1.00</td>
</tr>
<tr>
<td>Error</td>
<td>3355.58</td>
<td>128</td>
<td>26.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4957.71</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. **Significant at the p < 0.001.*

![Figure 4. Mean change scores for dysphoria by mood induction condition.](image)

- Positive Film Score: -1.22
- Negative Film Score: 1.37
- Control: 1.88

Mood Induction Condition
Research Question #2: What is the relationship between mood change induced by film score and the content of self-talk following a stressful event?

The investigator measured self-talk following a stressful event using a questionnaire developed in consultation with Oliver (E. Oliver, personal communication,
January, 2015). For the present study, each participant wrote three self-talk statements that occurred most often during the 30-minute stressor. Subsequently, each participant was given the questionnaire which included 14 evaluative items; 7 for informational self-talk and 7 for controlling self-talk. Each participant then used a 5-point Likert Scale to determine the level of agreement between each self-talk statement and each of the 14 evaluative items. Both informational and controlling self-talk scores range from 0 to 35 and are not mutually exclusive. For example, a self-talk statement can be equally informational and controlling.

In accordance with Oliver’s scoring method, the investigator added scores from all 7 informational evaluative items for each of the three self-talk statements, then added the three sums, and divided by three to obtain the grand mean for informational self-talk. Controlling scores were determined in the same manner for each participant using the 7 evaluative items for controlling self-talk, thereby obtaining a grand mean for controlling self-talk. The abovementioned scoring method gave the investigator both an informational self-talk grand mean and a controlling self-talk grand mean.

Score averages for informational and controlling self-talk were nearly even in the control group; the informational mean was 20.72 (SD 5.21) while the controlling mean was 20.5 (SD 5.02). For participants in the negative film score mood induction, informational self-talk scores averaged 21.82 (SD 6.25) and controlling self-talk scores averaged 20.28 (SD 5.04). Informational self-talk scores for participants in the positive film score mood induction averaged 22.03 (SD 6.03), while controlling self-talk scores averaged 17.69 (SD 3.87). See Table 12 for this information.
Table 12

*Self Talk Questionnaire Scores After Stressor Across Mood Induction Conditions*

<table>
<thead>
<tr>
<th>Self Talk Content</th>
<th>Positive Film Score</th>
<th>Negative Film Score</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=41</td>
<td>N=49</td>
<td>N=41</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>Range</td>
</tr>
<tr>
<td>Informational Scores</td>
<td>22.03</td>
<td>6.03</td>
<td>26.34</td>
</tr>
<tr>
<td>Controlling Scores</td>
<td>17.69</td>
<td>3.87</td>
<td>17.33</td>
</tr>
</tbody>
</table>

*Note.* Possible self-talk scores can range from 0 to 35. Each self-talk statement can be both informational and controlling (scores are not mutually exclusive).

The investigator used Pearson’s product-moment correlation coefficient to determine the relationship between mood change and self-talk content for participants who listened to negative film score. PASS change scores and controlling self-talk scores had a significantly negative correlation ($r = -.35, p < .05$). Therefore, 12.25% of the variability in controlling self-talk scores can be explained by changes in PASS mood scores. As PASS change scores decreased during negative mood induction, controlling self-talk scores increased.

Non-significant relationships included a negative correlation between PASS change scores and informational self-talk, ($r = -.12, p = .43$). Dysphoria change scores had a non-significant positive correlation with informational self-talk, ($r = .06, p = .67$), and controlling self-talk, ($r = .08, p = .60$). See Table 13 for more information on the correlations in the negative mood induction condition.
Table 13

Correlations Between PASS and Dysphoria Change Scores and Self-Talk Scores in the Negative Film Score Mood Induction Condition

<table>
<thead>
<tr>
<th></th>
<th>PASS Change Score</th>
<th>Dysphoria Change Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational Self-Talk Score</td>
<td>-.12</td>
<td>.06</td>
</tr>
<tr>
<td>Controlling Self-Talk Score</td>
<td>-.35*</td>
<td>.08</td>
</tr>
</tbody>
</table>

*Note. Correlation is significant at * $p < .05$ (two-tailed).

The investigator also used Pearson’s product-moment correlation coefficient to determine the relationship between mood change and self-talk content in participants who listened to positive film score. PASS change scores and informational self-talk scores had a significantly negative correlation ($r = -.31$, $p < .05$), therefore, 9.61% of variability in informational self-talk scores can be explained by changes in PASS change scores. As PASS change scores increased during positive film score, informational self-talk scores decreased. The test indicated no significant correlations between any other self-talk scores and mood change scores.

Non-significant relationships included a positive correlation between PASS change scores and controlling self-talk, ($r = .07$, $p = .66$). Dysphoria change scores had a non-significant negative correlation with informational self-talk, ($r = -.17$, $p = .29$), and controlling self-talk, ($r = -.04$, $p = .82$). See Table 14 for more information on the correlations in the positive mood induction condition.
Table 14

*Correlations Between PASS and Dysphoria Change Scores and Self-Talk Scores in the Positive Mood Induction Condition*

<table>
<thead>
<tr>
<th></th>
<th>PASS Change Score</th>
<th>Dysphoria Change Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational Self-Talk Score</td>
<td>-.31*</td>
<td>-.17</td>
</tr>
<tr>
<td>Controlling Self-Talk Score</td>
<td>.07</td>
<td>-.04</td>
</tr>
</tbody>
</table>

*Note.* Correlation is significant at *p* < .05 (two-tailed).

Finally, the investigator used Pearson’s product-moment correlation coefficient to determine the relationship between mood change and self-talk content for participants who listened to environmental sounds in the control group. Dysphoria change scores and informational self-talk scores had a significantly positive correlation (*r* = .31, *p* < .05), therefore, 9.61% of variability in informational self-talk scores can be explained by changes in dysphoria change scores. As dysphoria change scores increased, informational self-talk scores also increased. The test indicated no significant correlations between any other self-talk scores and mood change scores.

Non-significant relationships included a negative correlation between dysphoria change scores and controlling self-talk, (*r* = -.05, *p* = .76). PASS change scores had a non-significant negative correlation with informational self-talk, (*r* = -.15, *p* = .37), and controlling self-talk, (*r* = -.11, *p* = .50). See Table 15 for more information on the correlations in the control mood induction condition.
Table 15

*Correlations Between PASS and Dysphoria Change Scores and Self-Talk Scores in the Control Mood Induction Condition*

<table>
<thead>
<tr>
<th></th>
<th>PASS Change Score</th>
<th>Dysphoria Change Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational Self-Talk Score</td>
<td>-.15</td>
<td>.31*</td>
</tr>
<tr>
<td>Controlling Self-Talk Score</td>
<td>-.11</td>
<td>-.05</td>
</tr>
</tbody>
</table>

*Note.* Correlation is significant at *p < .05* (two-tailed).

The investigator also used Pearson’s product-moment correlation coefficient to determine the relationship between mood change and self-talk content in all participants collapsed across all three mood induction conditions. PASS change scores and controlling self-talk scores had a significantly negative correlation (*r* = -.27, *p < .01), therefore, 7.29% of the variability in controlling self-talk scores was explained by changes in positive mood scores. As PASS change scores decreased, controlling self-talk scores increased. The test indicated no significant correlations between any other self-talk scores and mood change scores.

Non-significant relationships included a negative correlation between PASS change scores and informational self-talk, (*r* = -.12, *p = .19). Dysphoria change scores had a non-significant positive correlation with informational self-talk, (*r* = .03, *p = .75), and controlling self-talk, (*r* = .10, *p = .27). See Table 16 for more information on the correlations across all mood induction conditions.
Table 16

*Correlations Between PASS and Dysphoria Change Scores and Self-Talk Scores in All Conditions*

<table>
<thead>
<tr>
<th></th>
<th>PASS Change Score</th>
<th>Dysphoria Change Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational Self-Talk Score</td>
<td>-.12</td>
<td>.03</td>
</tr>
<tr>
<td>Controlling Self-Talk Score</td>
<td>-.27**</td>
<td>.10</td>
</tr>
</tbody>
</table>

*Note.* Correlation is significant at ** $p < .01$ (two-tailed).
Chapter 5

Discussion

This study investigated the relationships between the constructs of film score, mood change, and self-talk in response to a stressor. The emphasis of examination was on the effect of film score on mood, and the subsequent effect of film score-induced mood change on the content of self-talk. Included in this chapter are interpretations of the data analyses, as well as limitations of the study, implications for clinicians in music therapy, and recommendations for future research.

Discussion of the Research Questions

The first research question observed the effect of film score on mood. For mood induction, participants were randomly assigned to a condition based on the three levels of the independent variable: negative film score, positive film score, and control. Participants who were assigned to the negative film score group listened to film score excerpts that portrayed feelings of sadness, loss and/or disappointment for 15 minutes. In the positive film score group, participants listened to film score excerpts that depicted feelings of happiness and/or encouragement for 15 minutes. Those participants who were assigned to the control group listened to a 15-minute recording of naturally-occurring sounds from a classroom.

The results provide evidence that film score does have an effect on mood. The raw percentage data support the supposition that when listening to negative film score, the listener is likely to have an increase in dysphoria and a decrease in positive mood. The raw percentage data also reveal that when listening to positive film score, the listener is likely to show a decrease in dysphoria and an increase in positive mood. Average
change scores further support these assertions. For example, average dysphoria change scores increased for negative film score listeners and decreased for positive film score listeners. In contrast, average PASS change scores increased for positive film score listeners and decreased for negative film score listeners. The control condition seemed to affect dysphoria and PASS change scores the most; the largest increase in dysphoria scores and the largest decrease in PASS scores suggest that many participants found the control condition to be unpleasant.

These results demonstrate a main effect of mood induction condition on mood change scores in this sample, meaning mood change resulted from the nature of the stimulus used in the mood induction condition. Based on participant report, negative film score effectively increased dysphoria and decreased positive affect. Meanwhile, positive film score effectively increased positive affect and resulted in decreased dysphoria. While these results are reliable and promising, they must be interpreted with caution due to the high variability in data reflected in the relatively large standard deviations. This observation suggests that some participants responded in predictable ways to the stimuli, while others did not.

The findings reported here appear to agree with previous research. Other researchers studying the effect of music on mood have used negative film score in order to induce dysphoria (Clark & Teasdale, 1985; Martin, 1990; Vuoskoski & Eerola, 2012). In Clark and Teasdale (1985) as well as Martin (1990), researchers successfully induced depressed mood with the film score *Russia Under The Mongolian Yoke* at half speed, a piece also used in the present study. In Vuoskoski and Eerola (2012), researchers effectively induced sadness using select film score from their own previous research
The film score used to induce sadness were a compilation of fragments from more recognizable films; therefore, the music was not used in the present study.

Many researchers have also studied the effect of music on positive mood; however, Gold et al. (2013) specifically used positive film score to elicit a pleasurable response. In their study, participants rated the film score in a listening test by pleasantness, familiarity and arousal. This process was used to identify pleasurable and neutral music for subsequent use during a cognitive learning task. Although the authors did not report specifically on ratings, they hypothesized that positive film score would induce pleasantness and/or arousal through activation of the neural reward system. Key structures in the dopaminergic reward system include the nucleus accumbens and the ventromedial prefrontal cortex. Further research explored emotion in relation to specific elements of music found in film score.

To explain emotional response to film score, research has explored which musical elements are used to convey or evoke specific emotions (Cohen 2013; Juslin & Västfjäll, 2008; Mohn et al., 2011; Sloboda & Juslin, 2001). To induce positive mood, the present researcher selected scores with majestic musical swells in major keys, ascending melodic movement and the use of brass instruments, especially trumpet, as these musical properties tend to signal happiness or inspiring moments in a film. To induce negative mood, the present researcher selected scores that used minor keys and chords, mostly dissonant tones, descending melodic movement, and sustained tones of stringed instruments, as these musical properties tend to signal loss or depression within a film (Boltz, 2004; C. Boardman, personal communication, August 2014, November 2014;
Ellis & Simons, 2005; Green, 2010; R. Murciano, personal communication, November 2014). The present findings suggest that the selection of film scores for this study were appropriate for the intended mood changes, and that the process of selection was necessary.

Previous research using film score for emotional perception or induction used similar musical components, such as brass and major modalities to convey happiness or legato strings and minor modalities to convey sadness (Eerola & Vuoskoski, 2011; Juslin & Västfjäll, 2008; Vuoskoski & Eerola, 2012). Juslin and Västfjäll (2008) offer a process called emotional contagion in explanation of how musical emotion is communicated to the listener. When emotion is portrayed in music, the listener first perceives the emotion, and then through what the researchers identify as a possible activation of mirror neurons, the listener expresses the emotion that was perceived. For example, the listener’s emotional expression may include crying, smiling, laughing or furrowing one’s eyebrows. These emotional expressions seem to be the result of experiencing the emotion.

The second research question observed the relationship between any changes in mood induced by film score and the subsequent content of self-talk. For the present study, each participant wrote three self-talk statements that occurred most often during a 30-minute stressor. Each participant then evaluated each self-talk statement, which further identified it as either informational or controlling. The resulting relationships seemed contradictory to the researcher’s expectations. Initially, the researcher expected that increases in positive affect would lead to decreases in controlling self-talk and/or increases in informational self-talk. Additionally, the researcher expected increases in
negative affect to lead to decreases in informational self-talk and/or increases in controlling self-talk.

In the current study, results indicated that as positive affect decreases in negative film score listeners, the use of self-talk increases in general. However, only the increase in controlling self-talk was significant. Apparently, as mood became more disturbed, the use of self-talk increased and became more rigid. Meanwhile, as positive affect increases in positive film score listeners, informational self-talk decreases significantly. Therefore, a positive change in mood of a sufficient amount could override the need for informational self-talk, indicating less of a psychological need to self-regulate. In the control condition, as dysphoria increases, the use of informational self-talk also increases. Collectively, these results suggest that emotion is being regulated, and the content of self-talk may reflect efforts of self-regulation.

Previous research supports the aforementioned interpretation, establishing that music listening affects emotional response, and subsequent cognitive processing (Gold et al., 2013). For self-talk specifically, this interpretation aligns with previous findings relating the self-determination theory to the use of self-talk for emotion regulation (Oliver, Markland, Hardy and Petherick, 2008; Oliver et al., 2010). Oliver et al. (2008), in accordance with the self-determination theory, assert that individuals strive to fulfill various psychological needs, such as autonomy and competency (Deci and Ryan, 1985; 2000). When these needs are unfulfilled, well-being is compromised and self-talk may be used as a tool of self-regulation.

In the present study, the increase in self-talk usage in response to a decrease in positive affect, or an increase in negative affect, reflects a greater need to self-regulate
according to previous findings of self-determination theory. As the participants’ scores began to reflect a threat to their sense of well-being, the scores reflecting self-talk usage increased. Likewise, a decrease in informational self-talk in response to an increase in positive affect reflects less of a need to self-regulate. As the participants’ scores began to reflect neutralization of the threat to their sense of well-being, self-talk decreased.

The content of self-talk in the present results might be best interpreted in light of the cognitive evaluation theory, a sub-theory within the self-determination theory (Deci & Ryan, 1985; Oliver et al., 2010). Cognitive evaluation theory explains how self-regulation occurs when an event can be interpreted in various ways. For example, self-talk, a self-regulating event, can become forceful if a person only sees one road to success. In contrast, self-talk can become supportive if a person sees multiple paths that lead to success. Forceful self-regulation is considered controlling, while supportive self-regulation is informational. Researchers are exploring influential variables in people’s everyday lives, including environmental perceptions, mood, and perceived self-confidence.

In accordance with both theories, Oliver et al. (2010) posits that controlling self-talk will likely lead to poor well-being, while informational self-talk will likely lead to better well-being. The researchers found a significantly positive association between informational self-talk and positive affect. In addition, a significant positive association emerged between controlling self-talk and negative affect. The authors also explain that self-talk may be mediated by arousal in addition to mood.

While the present study did not find the same relationships between mood and the content of self-talk, two more findings from Oliver et al. (2010) were reported that could
relate to the present findings. Based on non-significant associations, Oliver et al. (2010) found that the absence of informational self-talk does not necessarily indicate the occurrence of controlling self-talk or negative affect. The results of the control condition in the present study support the concept that the absence of informational self-talk is not indicative of the presence of negative affect; an increase in negative affect led to higher informational self-talk. This parallel growth indicates that both controlling and informational self-talk can be used in the process of self-regulation when negative affect threatens one’s sense of well-being.

Limitations of the Study

Four apparent limitations to this study include the low level of stress induced by the stressor, the lack of reliability for the modified self-talk questionnaire, no documentation of initial stress levels, and the mood induced by the control condition. The sources of stress included the statistical instructional video and the desire for incentives. Participants reported very low levels of stress from watching the statistical instructional video. Across all listening conditions, 30 participants reported “no stress at all” on the lecture assessment after watching the stressor video. An additional 40 participants across all listening conditions reported a minimal level of stress. An insufficient level of stress challenges the results and implications of the present study in regard to the nature of self-talk, as low stress levels may not accurately trigger self-talk. See Appendix F for more information.

The researcher collaborated with Oliver (E. Oliver, personal communication, January, 2015) to modify the self-talk questionnaire used to evaluate self-talk. The present study is the first one to use the modified questionnaire; thus, it has not been tested
for reliability or validity. If the questionnaire demonstrates low content validity, it could skew any results relating to self-talk, especially regarding the distinction between informational and controlling self-talk. With low reliability, the results could arguably be pure coincidence, such that the likelihood of reproducing similar results would be small.

In addition, the present researcher did not account for each participant’s stress level at the start of the testing session. As with mood, each participant came in with varying levels of stress that may have contributed to the results of this study. This initial stress level may or may not have been captured with the mood assessment, or only partially so. This error may have concealed minute changes in stress levels resulting from this study, as well as any resulting conclusions. One possible conclusion may involve the efficacy of the stressor.

Moreover, though the researcher intended the control group to be a neutral listening condition, it actually induced a negative mood in participants. The control condition is meant to show a typical situation, without experimental influence. Because the neutral condition in this study induced a mood, it became an additional experimental condition. Therefore, these results did not include a neutral listening condition for proper comparison of a typical situation.

**Recommendations for Future Research**

Future research regarding more diverse emotions using film score, such as anxiety or serenity, may further support the use of film score in a clinical setting. This study found that film score shifted mood toward an intended valence; perhaps film score could be helpful in modifying other emotions towards an intended arousal level. Using film score to induce anxiety or serenity might be beneficial in clinical populations with mood
disturbances. Moreover, a sufficient stressor, such as public speaking, may further clarify the nature of self-talk. If participants become more stressed, they might produce more intense self-talk which could further demonstrate relationships with mood.

Future research should test the validity and reliability of the self-talk questionnaire. With proper reliability testing, future researchers can make any adjustments necessary to better predict the likelihood of reproducing similar results. Moreover, testing the content validity would verify the characterizations of both controlling and informational self-talk. Tests that reveal satisfactory content validity and reliability would support the results produced from this questionnaire.

In future research, participants should be tested for an initial stress level in order to create a reference point for comparison of any subsequent results. Without knowledge of initial stress levels, any shifts in stress may have gone unnoticed in the present study. Moreover, this study needs a neutral listening condition and a silent condition. The control listening condition in the present study unintentionally induced a negative mood in the majority of its listeners. A more neutral listening condition, such as unrepeated recorded environmental sounds or naturally occurring sounds from the session environment, will strengthen comparisons of the effects of film score on mood. In addition, a silent condition with some type of sound buffering equipment, such as disposable earplugs, will help clarify the effects of the different listening conditions on mood.

**Implications**

The present study supports an influential relationship between music, affect, and cognition. Based on the intentions of the composer, film score can induce negative or
positive emotions in listeners. Though most genres of music can produce an emotional response in people, film score is intentionally composed to shift mood and communicate emotion. The results of this research provide implications for future research in music and emotion, as it supports film score as a tool for musical mood induction.

Furthermore, the emotional responses to film score appear to be related in significant ways to subsequent cognitive performance. Participants who listened to negative film score experienced a negative shift in mood. Following that negative shift in mood, those participants tended to use self-talk more. Moreover, this cognitive performance seems to reflect efforts toward self-regulation as reflected in the pattern of self-talk usage following each mood shift. Across all listening conditions, when mood shifted positively, the use of self-talk decreased. When mood shifted negatively, the use of self-talk increased.

This study utilized musical elements that can be considered when choosing music for inducing a specific mood in a clinical setting. Through careful selection of major or minor key, timbre, rhythm and pitch, film score can be used to intentionally shift mood in a certain direction. When selecting film score for positive mood induction, the researcher searched for music with major keys, brass instruments, majestic swells and higher pitches. In contrast, film score for the negative mood induction included the use of minor keys, lower pitches and slower tempi. These musical components successfully communicated the intended emotions to the listener and produced desired mood change. Knowing which musical elements to search for in film score can be beneficial for a clinician seeking to modify affect, adjust maladaptive self-views and improve coping strategies.
Board-certified music therapists use specific techniques to target emotional issues, such as recognition, expression, and proper management of emotional behaviors. If film score is used to elicit an emotional response, clinicians can then reshape cognitive function. Using the NMT technique Music in Psychosocial Training and Counseling, a clinician can use film score to first promote an affective response, then explore content of subsequent self-talk as a self-regulation strategy through verbal processing (Wheeler, 2014). This approach would be most beneficial in children and adults with mood disorders, such as depression or an anxiety disorder. By using film score with music therapy, a clinician might help an individual access positive affect and subsequent cognitive strategies that can be useful in successfully managing negative affect.
References


Hello!!!
And thank you for participating in my survey!!!
Your feedback is much appreciated!!!

Ahead, you will find 14 quick questions based on less than 10 minutes of music. This entire survey should take no more than 15-20 minutes, even if you get stuck on a question.

Each page should be completed within the length of the song (which is less than 2 minutes). If you feel you need more time, just hit pause on the music. Please listen to the tracks in order by the titles of each song, i.e., Song 1, Song 2.

REMEMBER: one page per song.

If you would like to know your results and/or how this survey will be used, simply send me an inquiry at a.davis24@miam.edu.

OK, READY?? Here...we.......GO!

(Hit play on the first audio track that was attached to the email you were sent)
**Listening Party!**

**Song #1**

These questions are for the first song. Try to be as thorough and HONEST as possible.

1. **Describe the mood of this song. (Select all that apply; try to answer WHILE listening)**
   - [ ] angry
   - [ ] serene, calm, relaxing
   - [ ] pleasant
   - [ ] unpleasant
   - [ ] sad, melancholy
   - [ ] scary
   - [ ] warm
   - [ ] cautious
   - [ ] happy, joyous
   - [ ] disgusted
   - [ ] excited
   - [ ] tender
   - [ ] loving
   - [ ] reflective
   - [ ] creepy
   - [ ] full of wonder
   - [ ] anxious, tense
   - [ ] inspiring, hopeful
   - [ ] depressing, gloomy
   - [ ] peppy, cheerful

   What is the primary mood of this song? (Please choose one mood from above)

2. **If you had to name this song based on its emotional content, what would the title be?**

3. **For the duration of the song, how consistently was the primary mood portrayed?**

   | Not so much | | | | | Complete |
   | --- | --- | --- | --- | --- |
   | [ ] | [ ] | [ ] | [ ] | [ ] | [ ] |
Listening Party!

Song #2

These questions are for the second song...same questions, new song.

4. Describe the mood of this song. (Select all that apply; try to answer WHILE listening)

- angry
- serene, calm, relaxing
- pleasant
- unpleasant
- sad, melancholy
- scary
- warm
- cautious
- happy, joyous
- disgusted
- excited
- tender
- loving
- reflective
- creepy
- full of wonder
- anxious, tense
- inspiring, hopeful
- depressing, gloomy
- peppy, cheerful

What is the primary mood of this song? (Please choose one mood from above)

5. If you had to name this song based on its emotional content, what would the title be?

6. For the duration of the song, how consistently was the primary mood portrayed?

<table>
<thead>
<tr>
<th>Not so much</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>
**Listening Party!**

**Song #3**

These questions are for the third song...try to be as thorough and HONEST as possible. Questions are the same...again.

7. Describe the mood of this song. (Select all that apply; try to answer WHILE listening)

- [ ] angry
- [ ] serene, calm, relaxing
- [ ] pleasant
- [ ] unpleasant
- [ ] sad, melancholy
- [ ] scary
- [ ] warm
- [ ] cautious
- [ ] happy, joyful
- [ ] disgusted
- [ ] excited
- [ ] tender
- [ ] loving
- [ ] reflective
- [ ] creepy
- [ ] full of wonder
- [ ] anxious, tense
- [ ] inspiring, hopeful
- [ ] depressing, gloomy
- [ ] peppy, cheerful

What is the primary mood of this song? (Please choose one mood from above)

8. If you had to name this song based on its emotional content, what would the title be?

9. For the duration of the song, how consistently was the primary mood portrayed?

| Not so much | | | | | Completely |
|-------------|-------------|-------------|-------------|-------------|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Page 4
Listening Party!

Song #4

These questions are for the fourth and final song...again, try to be as thorough and HONEST as possible.

10. Describe the mood of this song. (Select all that apply; try to answer WHILE listening)

- [ ] angry
- [ ] serene, calm, relaxing
- [ ] pleasant
- [ ] unpleasant
- [ ] sad, melancholy
- [ ] scary
- [ ] warm
- [ ] cautious
- [ ] happy, joyous
- [ ] disgusted
- [ ] excited
- [ ] tender
- [ ] loving
- [ ] reflective
- [ ] creepy
- [ ] full of wonder
- [ ] anxious, tense
- [ ] inspiring, hopeful
- [ ] depressing, gloomy
- [ ] peppy, cheerful

What is the primary mood of this song? (Please choose one mood from above)

11. If you had to name this song based on its emotional content, what would the title be?

12. For the duration of the song, how consistently was the primary mood portrayed?

<table>
<thead>
<tr>
<th>Not so much</th>
<th>Somewhat</th>
<th>Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This is the last page...promise. Try to concentrate on the playlist overall...yup, all three or four songs. Then you're done.

13. Did this music affect your mood? In your own words, please explain.

14. Did you recognize any song from this playlist?
   - No
   - Yes

   If yes, please name the piece(s)
## APPENDIX B
The Removed Scores

<table>
<thead>
<tr>
<th>Score</th>
<th>Title</th>
<th>Year</th>
<th>Length (in secs)</th>
<th>Scorer</th>
<th>Film</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>End Logo</td>
<td>1989</td>
<td>:21</td>
<td>Alan Silvestri</td>
<td><em>Back To The Future II</em></td>
</tr>
<tr>
<td>2</td>
<td>Back To The Future</td>
<td>1985</td>
<td>3:31</td>
<td>Alan Silvestri</td>
<td><em>Back To The Future</em></td>
</tr>
<tr>
<td>3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Heart of Courage</td>
<td>N/A</td>
<td>1:57</td>
<td>Two Steps From Hell</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<sup>a</sup> These pieces were removed for failing to meet the researcher’s criteria. See the Final Selection portion of the Materials section in Methods for more information.

<sup>b</sup> This piece was written and marketed as a commercial use film score.
APPENDIX C
Self-Talk Questionnaire

Please write down three statements that you said (aloud or silently) to yourself during the lecture.

Statement 1:

Statement 2:

Statement 3:
APPENDIX C
Self-Talk Questionnaire

Rate your first statement on how much it relates to each item.
(Ratings on the right side; items on the left side)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not At All</td>
<td>Very Little</td>
<td>Not sure my statement relates to this item</td>
<td>Quite A Bit</td>
<td>Very Much So</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Ratings for Statement 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Made me feel I was in control</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. Made me feel pressured</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Was encouraging</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Made me feel I had no choices</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Made me feel more in charge</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. Was critical</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. Assisted my understanding</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Made me feel I had no control over the situation</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>9. Helped reduce the pressure I put on myself</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>10. Told me the way I had to do the task</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>11. Provided me with positive feedback</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>12. Put me under pressure to succeed</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>13. Reassured me I was in control</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>14. Made me feel I must do well at the task</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
Rate your second statement on how much it relates to each item.
(Ratings on the right side; items on the left side)

<table>
<thead>
<tr>
<th>Items</th>
<th>Ratings for Statement 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Made me feel I was in control</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. Made me feel pressured</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Was encouraging</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Made me feel I had no choices</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Made me feel more in charge</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. Was critical</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. Assisted my understanding</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Made me feel I had no control over the situation</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>9. Helped reduce the pressure I put on myself</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>10. Told me the way I had to do the task</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>11. Provided me with positive feedback</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>12. Put me under pressure to succeed</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>13. Reassured me I was in control</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>14. Made me feel I must do well at the task</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
Rate your third statement on how much it relates to each item.
(Ratings on the right side; items on the left side)

<table>
<thead>
<tr>
<th>Items</th>
<th>Ratings for Statement 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Made me feel I was in control</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. Made me feel pressured</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. Was encouraging</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4. Made me feel I had no choices</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. Made me feel more in charge</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. Was critical</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. Assisted my understanding</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. Made me feel I had no control over the situation</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>9. Helped reduce the pressure I put on myself</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>10. Told me the way I had to do the task</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>11. Provided me with positive feedback</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>12. Put me under pressure to succeed</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>13. Reassured me I was in control</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>14. Made me feel I must do well at the task</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
APPENDIX D
Lecture Assessment

Directions: Please read each question thoroughly. Then, indicate your response by marking the appropriate number with a circle.

How confident are you in your understanding of the material discussed in the DVD?

Not at all confident                       Very confident
1                                          2
                                          3
                                          4

Some people may experience stress while watching instructional videos. Please rate the degree of stress you may or may not have felt while attempting to view, understand, and retain the material discussed in the DVD.

Not at all stressed                       Very stressed
1                                          2
                                          3
                                          4

How would you rate your overall experience with this lecture?

Very negative                            Very positive
1                                          2
                                          3
                                          4
The following information describes the research study in which you are being asked to participate. Please read the information carefully. At the end, you will be asked to sign if you agree to participate.

**CONTACT INFORMATION:**
Angela Davis, Student Researcher – 305.814.6383
Dr. Shannon de l’Etoile, Principal Investigator – 305.284.2241

**PURPOSE:**
You are being asked to participate in a research study. The purpose of this study is to find out how music affects mood and self-talk. Results of the research will be used to help understand the connection between music, mood, and thinking.

**PROCEDURES:**
You will complete one testing session. The testing session will last approximately 75 minutes. As a participant, you will be 1 out of 150 college students randomly assigned to a listening condition, where you may hear music or other sounds.

During your testing session, you will complete the following:

- Consent form (varied)
- Demographic form (3 mins.)
- Mood Induction Procedure (25 mins.)
  - Mood Assessment #1 (5 mins.)
  - Listening Condition (15 mins.)
- Mood Assessment #2 (5 mins.)
- Watch instructional video (30 mins.)
- Self-Talk Questionnaire (15 mins.)
- Lecture Assessment (2 mins.)

If at any time you or the researcher feels that it would be best to stop data collection, the procedure will be terminated. In this case, any collected data will be destroyed immediately.

The testing session will take place in either the Marta and Austin Weeks Music Library, located at 5501 San Amaro Drive on the University of Miami Coral Gables campus, or the Otto G. Richter Library, located at 1300 Memorial Drive on the University of Miami Coral Gables campus. Location is based on room availability.

**RISKS:**
Participation in this research study poses the following risks:

1. You will participate in a mood induction procedure that will involve listening to an auditory stimulus. You may experience a negative shift in mood as a result. If so, the researcher will offer a positive mood induction procedure to you after the study.
2. You may experience a mild transient form of stress that is comparable to what you might experience in an academic class.
3. After the study, all questions will be answered. Full disclosure of all procedures and any deception used in the study will be fully explained at that time.

**BENEFITS:**
You may learn something new about how you respond to music.

**ALTERNATIVES:**
You have the alternative to not participate in this study.

**CONFIDENTIALITY:**
The researcher will consider your records (paper and electronic) confidential to the extent permitted by law. The records will not be identified as pertaining to your in any publication without your expressed permission. Records include data collected during the procedure; records attained prior to the start of this testing session (including medical) will not be collected or assessed. The collected data will not contain any information that could be used to identify you. All data will be identified by an assigned code, not by your name.

All paper records pertaining to the study will be stored in the home of the researcher, Angela Davis, Tamarac, FL, in a locked cabinet. She is the only person who has access to this cabinet.

Electronic data from the study will be stored on Ms. Davis’ personal computer, also located in Tamarac, FL. This computer is password protected and only Ms. Davis will have access to these data.

All records will be kept in these secure locations for a period of seven years. After that time, all data will be destroyed.

The information will also be shared with the Principal Investigator of this study, Dr. Shannon de l’Etoile. This investigator will consider your records confidential to the extent permitted by law. Your records may also be reviewed for audit purposes by authorized University or other agents who will be bound by the same provisions of confidentiality.

**COSTS:**
Participation in this research study does not result in any kind of expense. Participants do not need to pay for anything or purchase anything in order to be part of the study. There is no cost associated with or required for participation in this research study.

**COMPENSATION:**
By participating in this study and completing a test session, you will receive a gift of monetary value. If a testing session is not completed, you will no longer be eligible for the gift.

**RIGHT TO DECLINE OR WITHDRAW:**
Your participation in this study is voluntary. You are free to refuse to participate in the study or withdraw your consent at any time during the study. The investigators reserve the right to remove you without your consent at such time that they feel it is in your best interest. In the case of participation withdrawal, any collected data will be destroyed.

Your desire to not participate in this study or request to withdraw will not adversely affect your status or grades at the University you currently attend. Participation is completely voluntary.

**OTHER PERTINENT INFORMATION:**
The student researcher, Angela Davis (305.814.6383) and Principal Investigator, Dr. Shannon de l’Etoile (305.284.2241), will gladly answer any questions you may have concerning the purpose, procedures, or outcome of this project. If you have any questions concerning the study or your participation in the study, please do not hesitate to contact either one of us. If:
- you have any questions about your rights as a research participant in this project,
- you cannot reach the research team,
- you would like to talk to someone other than the research team,
- your questions, concerns or complaints are not being answered by the research team,

you may contact the University of Miami’s Human Subjects Research Office at 305.243.3195.
**PARTICIPANT AGREEMENT:**
I have read the information in this consent form and agree to participate. I have had the chance to ask any questions I have about this study, and they have been answered for me. I am entitled to a copy of this form after it has been read and signed.

<table>
<thead>
<tr>
<th>Participant's Printed Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participant's Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Printed Name of Person Obtaining Consent</th>
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</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signature of Person Obtaining Consent</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

My signature below documents that the information in the consent document and any other written information was accurately explained to, and apparently understood by, the participant, and that consent was freely given by the participant.

<table>
<thead>
<tr>
<th>Printed Name of Witness to Consent Process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signature of Witness to Consent Process</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Possible lecture assessment responses can range from 1 to 4. In the question about the participant’s confidence level, a response of 1 indicates the participant was not at all confident, and 4, very confident, in understanding the concepts from the video. In the question regarding stress level, a 1 indicates the participant was not at all stressed, and 4, very stressed. In the question concerning the participant’s overall experience, a 1 reflects a very negative experience, while 4 reflects a very positive experience.

Table 17

*Lecture Assessment Responses Within Each Mood Induction Condition*

<table>
<thead>
<tr>
<th>Lecture Assessment Questions</th>
<th>Positive Film Score</th>
<th>Negative Film Score</th>
<th>Control Score</th>
<th>Across All Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=41</td>
<td>N=49</td>
<td>N=41</td>
<td>N=131</td>
</tr>
<tr>
<td>MTE</td>
<td>SD</td>
<td>MTE</td>
<td>SD</td>
<td>MTE</td>
</tr>
<tr>
<td>Confidence Level</td>
<td>3.37 0.80</td>
<td>3.14 0.79</td>
<td>3.07 0.85</td>
<td>3.19 0.81</td>
</tr>
<tr>
<td>Stress Level</td>
<td>2.15 0.82</td>
<td>2.25 0.93</td>
<td>2.49 0.87</td>
<td>2.29 0.88</td>
</tr>
<tr>
<td>Overall Experience</td>
<td>2.71 0.90</td>
<td>2.57 0.71</td>
<td>2.46 0.78</td>
<td>2.58 0.79</td>
</tr>
</tbody>
</table>